BJ-200

SERVICE MANUAL

Canon

Application

This manual has been issued by Canon Inc. for qualified persons to learn technical theory, installation, maintenance, and repair of products. This manual covers all localities where the products are sold. For this reason, there may be information in this manual that does not apply to your locality.

Corrections

This manual could include technical inaccuracies or typographical errors due to improvements or changes in the products. When changes occur in applicable products or in the content of this manual, Canon will release technical information as the need arises. In the event of major changes in the contents of this manual over a long or short period, Canon will issue a new editions of this manual.

The following paragraph does not apply to any countries where such provisions are inconsistent with local law.

Trademarks

The product names and company names described in this manual are the registered trademarks of the individual companies.

Copyright

This manual is copyrighted with all rights reserved. Under the copyright laws, this manual may not be copied, reproduced or translated into another language, in whole or in part, without the written consent of Canon Inc., except in the case of internal business use.

Copyright © 1992 by Canon Inc.

CANON INC.
BJ Products Quality Support Dept.
16-1, Shimonoge 3-chome, Takatsu-ku, Kawasaki-shi, Kanagawa 213, Japan

This manual was produced on an Apple Macintosh™ II ci personal computer and Apple LaserWriter™ II NTX-J laser beam printer; final pages were printed on Varityper™ 5300 with 4000-J RIP. A Canon mo-5001S Magneto-Optical Storage Subsystem with mo-502M Magneto-Optical Storage Disk Cartridge and mo-IF2 interface kit were used for storing large volumes of page layout and graphic data for this manual.
All graphics were produced with Aldus FreeHand™ 2.0J & 3.1J.
All documents and all page layouts were created with QuarkXPress™ 2.0J.

I. ABOUT THIS MANUAL

This manual is divided into four sections, and contains information required for servicing the unit.

Part 1: Safety and Precautions

This section tells you how to service the unit safely. It is very important, so please read it.

Part 2: Operating Instructions

This section explains how to operate the unit properly. Information required about installation and service made.

Part 3: Technical Reference

This section outlines the way the unit operates so you can understand it technically.

Part 4: Maintenance

This section explains how to maintain the unit. Descriptions of assembly/disassembly, adjustment for assembly, troubleshooting procedures, and wiring/circuit diagrams are given.

REF. Procedures for assembly/disassembly are not given in this manual. See the illustrations in the separate Parts Catalog.

II. TABLE OF CONTENTS

Page

Part 1: Safety and Precautions

1 - 1 1. PRECAUTION FOR PERSONNEL
1 - 1 1.1 Moving and Rotating Parts
1 - 2 1.2 Ink Stains
1 - 4 1.3 Live Circuits of the Printer
1 - 5 2. DANGER TO EQUIPMENT
1 - 5 2.1 Handling the BJ Cartridge
1 - 7 2.2 Handling the Printer
1 - 8 2.3 Precautions When Servicing
1 -10 3. PROTECTIVE FUNCTIONS
1 -10 3.1 Protective Functions for BJ Cartridge
1 -11 4. BUILT-IN SELF-TEST FUNCTION

Part 2: Operating Instructions

2 - 1 1. PRINTER SETUP
2 - 1 1.1 Unpacking
2 - 2 1.2 Installation Space
2 - 4 1.3 Names of Parts and Their Functions
2 - 6 1.4 Installation Procedure
2 - 8 1.5 Power-On/Power-Off
2 - 9 2. MOVING THE PRINTER
2 - 9 2.1 Carrying the Printer
2 - 9 2.2 Transporting the Printer
2 -10 3. FUNCTION SELECTOR
2 -10 3.1 Functions of Function Selector
2 -12 4. PRINTER SERVICE FUNCTIONS
2 -12 4.1 Error Display
2 -13 4.2 Control Key Service Functions
2 -13 4.2.1 BJ cartridge cleaning
2 -13 4.2.2 Auto-line-feed mode
2 -14 4.2.3 Offline test
2 -17 4.2.4 Online test

Part 3: Technical Reference

3 - 1 1. PRODUCT OUTLINE
3 - 1 1.1 Outline
3 - 1 1.1.1 Printer set
3 - 3 1.1.2 Optional components
3 - 3 1.1.3 Consumable
3 - 4 2. HARDWARE DESCRIPTION
3 - 4 2.1 Overview of Printer Components
3 - 6 2.2 BJ Cartridge
3 - 6 2.2.1 BJ cartridge structure
3 - 7 2.2.2 Bubble jet head unit structure
3 -11 2.3 Purge Unit
3 -11 2.3.1 Purge unit functions
3 -11 2.3.2 Purge unit structure
3 -13 2.4 Carriage Section
3 -13 2.4.1 Carriage section functions
3 -14 2.4.2 Carriage section structure
3 -16 2.5 Paper Feed Cut Sheet Feeder

Page
3 -16 2.5.1 Functions of paper feed/cut sheet feeder
3 -17 2.5.2 Paper feed/cut sheet feeder structure
3 -19 3. ELECTRONIC SYSTEM OF THE PRINTER
3 -19 3.1 Overview of the Electronic System of the Printer
3 -20 3.2 Logic Section
3 -20 3.2.1 Logic card functions
3 -21 3.2.2 Logic card block diagram
3 -22 3.2.3 Control section components
3 -25 3.3 Power Supply Section
3 -25 3.3.1 Power supply components
3 -25 3.3.2 Power supply section structure
3 -27 4. SPECIFICATIONS
3 -27 4.1 General Specifications
3 -29 4.2 Paper Specifications
3 -31 4.3 Interface Specification
3 -34 4.4. Character Code Tables
3 -34 4.4.1 BJ-10 mode
3 -37 4.4.2 LQ mode

Part 4: Maintenance

4 - 1 1. MAINTENANCE
4 - 1 1.1 Periodicarry-Replaced Parts
4 - 1 1.2 Consumables
4 - 1 1.3 Periodic Maintenance
4 - 2 2. SERVICE TOOLS
4 - 2 2.1 List of Tools
4 - 3 3. DISASSEMBLY AND REASSEMBLY
4 - 4 4. ADJUSTMENT
4 - 4 4.1 Adjustment Point
4 - 4 4.2 When to Adjust
4 - 5 4.3 Adjustment Method
4 - 5 4.3.1 Preparation for adjustment
4 - 6 4.3.2 Adjustment
4 - 8 5. TROUBLESHOOTING
4 - 8 5.1 Troubleshooting Overview
4 - 8 5.1.1 Definition of troubleshooting
4 - 8 5.1.2 Precautions for troubleshooting
4 - 9 5.2 Error Condition Diagnosis
4 -11 5.3 Error Recovery
4 -12 5.3.1 Initialization error
4 -13 5.3.2 Error indication
4 -14 5.3.3 Paper pick-up error
4 -15 5.3.4 Paper delivery error
4 -16 5.3.5 Carriage control error
4 -17 5.3.6 Purge error
4 -18 5.3.7 Poor print quality
4 -19 5.3.8 Paper feed motor check
4 -19 5.3.9 Carriage motor check
4 -20 5.3.10 Power not turned on
4 -21 5.3.11 Interface error
4 -22 6. CIRCUIT DIAGRAMS
4 -22 6.1 Component Drawings
4 -23 6.2 Schematic Circuit Diagrams

III. ILLUSTRATION INDEX

Page
1 - 1 Figure 1- 1 Moving and Rotating Parts
1 - 2 Figure 1- 2 Ink Path
1 - 2 Figure 1- 3 Nozzle Location
1 - 3 Figure 1- 4 Ink Mist
1 - 4 Figure 1- 5 Live Parts of Printer
1 - 5 Figure 1- 6 Removing the BJ Cartridge Protectors
1 - 5 Figure 1- 7 BJ Cartridge
1 - 7 Figure 1- 8 Contact Points
1 - 7 Figure 1- 9 Capping Position
1 - 8 Figure 1-10 Head Gap Adjustment
1 - 8 Figure 1-11 Releasing a Hook
1 - 9 Figure 1-12 Electronic System of the Printer
2 - 1 Figure 2- 1 Packing Arrangement
2 - 2 Figure 2- 2 Printer Location
2 - 3 Figure 2- 3 Bad Installation Places
2 - 4 Figure 2- 4 Names of Parts and Their Functions(1)
2 - 5 Figure 2- 5 Names of Parts and Their Functions(2)
2 - 6 Figure 2- 6 Removing Cartridge Protectors
2 - 6 Figure 2- 7 Installing BJ Cartridge
2 - 7 Figure 2- 8 Connecting Interface Cable
2 - 8 Figure 2- 9 Wrong Way for Power Off
2 - 9 Figure 2-10 Securing Carriage
2 -10 Figure 2-11 Function Selector
2 -12 Figure 2-12 Control Panel
2 -13 Figure 2-13 Nozzle Test Pattern
2 -14 Figure 2-14 Test Print Header
2 -15 Figure 2-15 ANK All-mode Pattern
2 -15 Figure 2-16 H Pattern
2 -15 Figure 2-17 Dot Pattern
2 -16 Figure 2-18 ASCII Character Pattern
2 -17 Figure 2-19 Hexadecimal Dump Mode (Sample)
3 - 1 Figure 3- 1 Printer
3 - 2 Figure 3- 2 BJ Cartridge
3 - 2 Figure 3- 3 User's Manual
3 - 3 Figure 3- 4 BJ Cartridge
3 - 5 Figure 3- 5 Printer Mechanism
3 - 6 Figure 3- 6 BJ Cartridge Structure
3 - 7 Figure 3- 7 Bubble Jet Head Nozzle(part)
3 - 8 Figure 3- 8 Head Rank ID
3 - 8 Figure 3- 9 Nozzle Arrangement
3 - 9 Figure 3-10 Print Signal
3 -10 Figure 3-11 Head Temperature Controller
3 -12 Figure 3-12 Purge Unit
3 -13 Figure 3-13 Carriage Section
3 -14 Figure 3-14 Paper Thickness Change Mechanism
3 -15 Figure 3-15 Paper Feed Motor Power Change
3 -16 Figure 3-16 Paper Feed
3 -17 Figure 3-17 Paper Selection

Page		
3-19	Figure 3-18	Electronic System of the Printer
3-20	Figure 3-19	Block Diagram
3-21	Figure 3-20	Logic Card Block Diagram
4-2	Figure 4-1	Points to Grease
4-4	Figure 4-2	Adjustment
4-5	Figure 4-3	Preparation for Adjustment
4-6	Figure 4-4	Head Gap Adjustment(1)
4-7	Figure 4-5	Head Gap Adjustment(2)

IV. TABLE INDEX

Page			
2 -10	Table	2- 1	BJ-10 Operating Characteristics
2 -11	Table	2- 2	LQ Mode Operating Characteristics
2 -11	Table	2- 3	Typeface
2 -11	Table	2- 4	International Character Set
2 -12	Table	2- 5	Error Display

1. PRECAUTIONS FOR PERSONNEL

1.1 Moving and Rotating Parts

Take care that hair, clothes, jewelry, etc., do not get caught in the moving and rotating parts of the printer.

These parts are the carriage belt, idler roller, carriage (driven by the carriage motor), and the slow-down gear, paper feed roller, pressure roller, eject roller, and pick-up roller (driven by the paper feed motor).

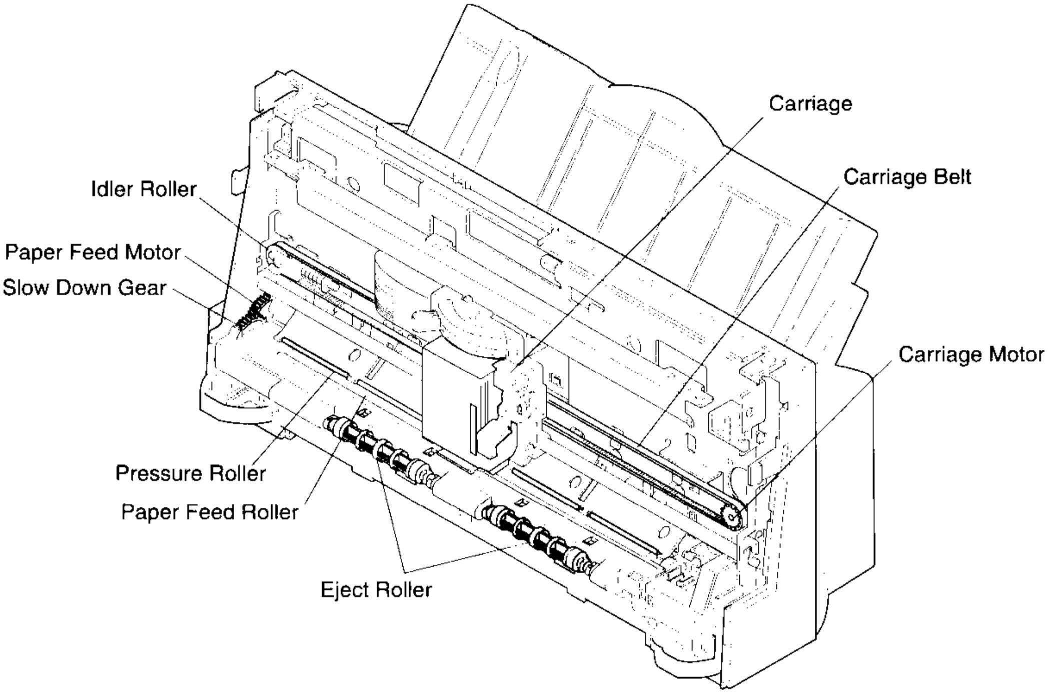

Carriage
Carriage Belt
Idler Roller
Paper Feed Motor
Slow Down Gear
Carriage Motor
Pressure Roller
Paper Feed Roller
Eject Roller

Figure 1-1 Moving and Rotating Parts

1.2 Ink Stains

a) Ink path

Do not touch anything in the ink path, otherwise the printer, work bench, your hands, or your clothes may get stained. The ink passes through the BJ cartridge nozzles, head cap, head wiper, and waste ink absorber.

CAUTION

The ink is not harmful to the human body, but contains an organic solvent (ispropyl alcohol 67-63-0). Do not swallow it or splash in your eyes. If you get ink in your eye, wash it out completely and see your doctor. If you accidentally swallow a lot of ink, see your doctor immediately and give him the information printed on the BJ cartridge label. The ink is water soluble, but contains dye. It will not come out if it gets on your clothes.

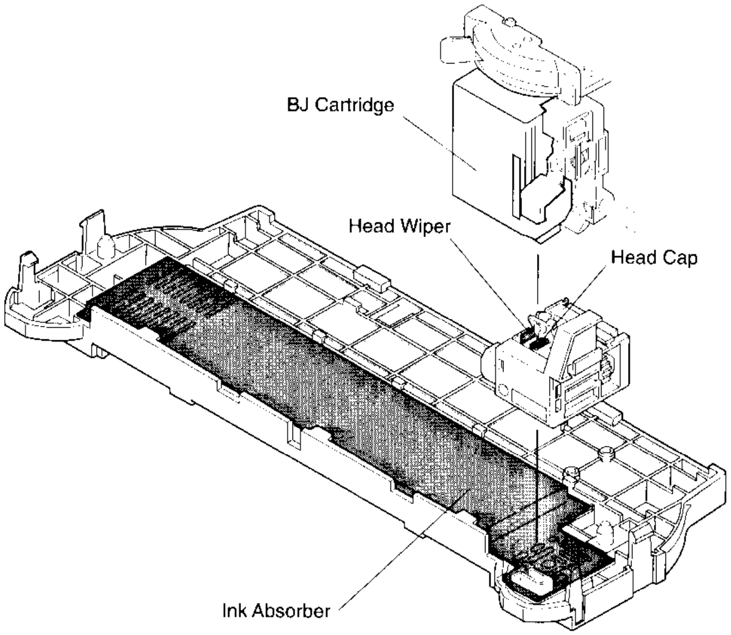


Figure 1-2 Ink Path

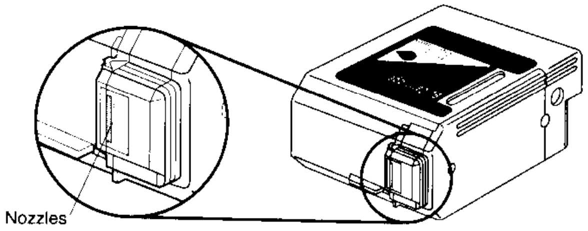


Figure 1-3 Nozzle Location

b) Ink mist

The BJ cartridge ejects the ink onto the print paper. When the printer has been used for a long time (say, several months), the slight ink mist that bounces off the paper may have stained the inside of the front cover and the platen. This stain can get on your hands or clothes during servicing, so wipe it off with, say, a damp paper towel.

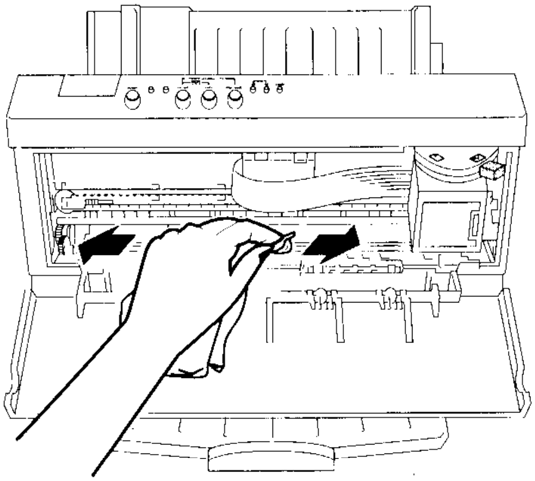


Figure 1-4 Ink Mist

1.3 Live Circuits of the Printer

As long as the printer is plugged into an electrical outlet, its electrical system is live, whether the power switch is on or off. Do not disassemble or service the printer while it is plugged in.

The AC input goes supplied to the primary side of the power supply unit. Before servicing the printer, unplug the power cord.

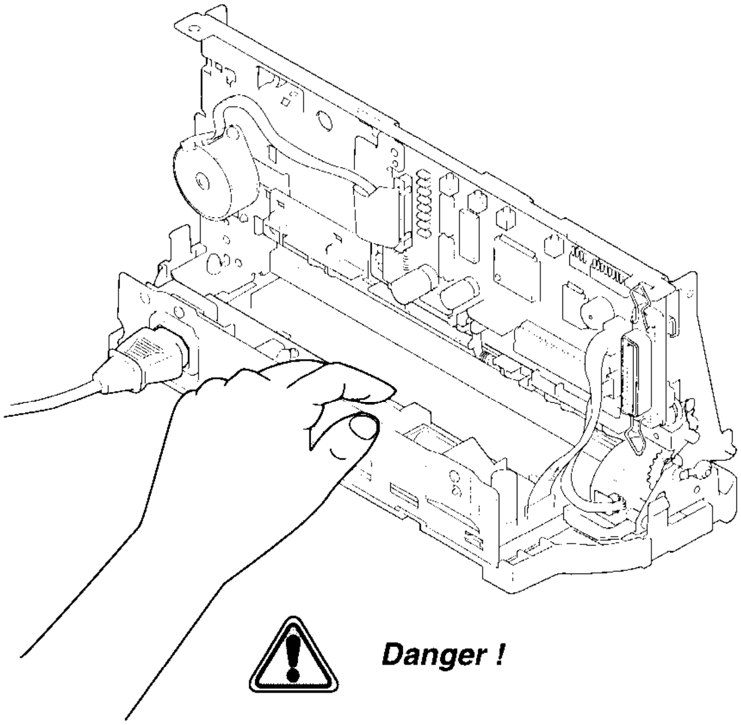


Figure 1-5 Live Parts of Printer

2. DANGER TO EQUIPMENT

2.1 Handling the BJ Cartridge

a) Unpacking the BJ cartridge

Do not open the BJ cartridge package unless you are ready to install the cartridge. After unpacking the BJ cartridge, carefully remove the head cover and sealing tape protecting the nozzles.

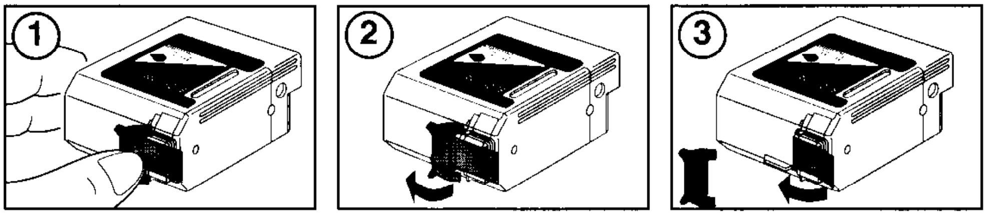


Figure 1-6 Removing the BJ Cartridge Protectors

b) Nozzle protection

To prevent the ink nozzles from getting clogging, do not touch the nozzles or wipe them off. Do not leave the cartridge with the head cover and sealing tape off. The BJ cartridge cannot be disassembled or washed.

NOTE Clogged nozzles leave horizontal white lines on the print. If this problem does not disappear after cleaning, replace the cartridge.

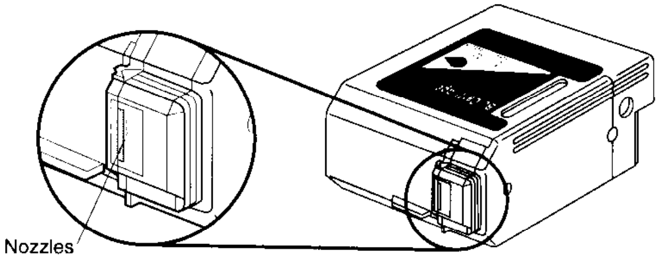


Figure 1-7 BJ Cartridge

c) Power on/off

After the power is switched off, the printer caps the BJ cartridge automatically to protect the cartridge and prevent ink leakage. The minimum interval between switching the power on and then off is three seconds.

NOTE If the power cord is pulled out when the printer is on, plug the cord back in and turn the power on again. After the printer starts normally, turn the power key off.

CAUTION If the nozzles do not get capped, they may get clogged with dried ink, or ink may leak from the cartridge.

d) When the printer is not being used

Even when the printer is not being used, leave the BJ cartridge in. Also, leave the cartridge in when carrying, moving, and storing the printer.

CAUTION If the cartridge is taken out of the printer, the ink nozzles may dry up and the cartridge become unusable.

e) Conductive ink

The ink in the cartridge is electroconductive. If it leaks onto a mechanical part, mop it up with a damp paper towel. If it leaks onto the electronic circuit, mop it up completely, paying attention to the bottoms of the IC's, with a tissue.

CAUTION Never switch the power on if there has been a leak. The circuit may may be damaged.

2.2 Handling the Printer

a) Damage by electrostatic discharge

The static charge on your body, produced by your clothes rubbing, can damage electronic components or change their electrical characteristics. To prevent such damage, never touch the carriage contact between the BJ cartridge and the printer logic card.

Electrostatic Discharge

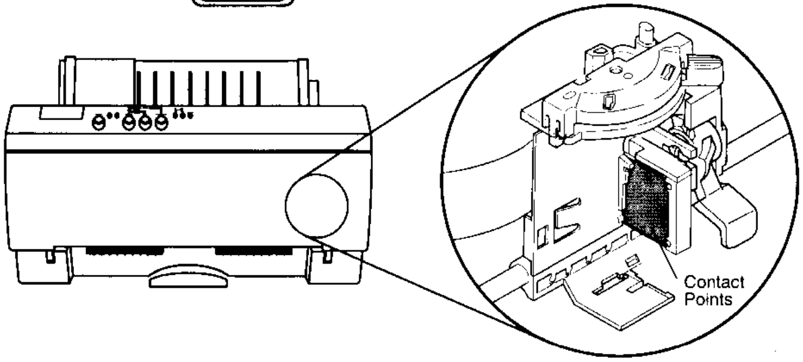


Figure 1-8 Contact Points

b) Ink leakage

If you move, pack, or store the printer without a BJ cartridge in it, the ink remaining in the purge unit may flow back and stain the inside of the printer. Before packing the printer, make sure the carriage is at the capping position.

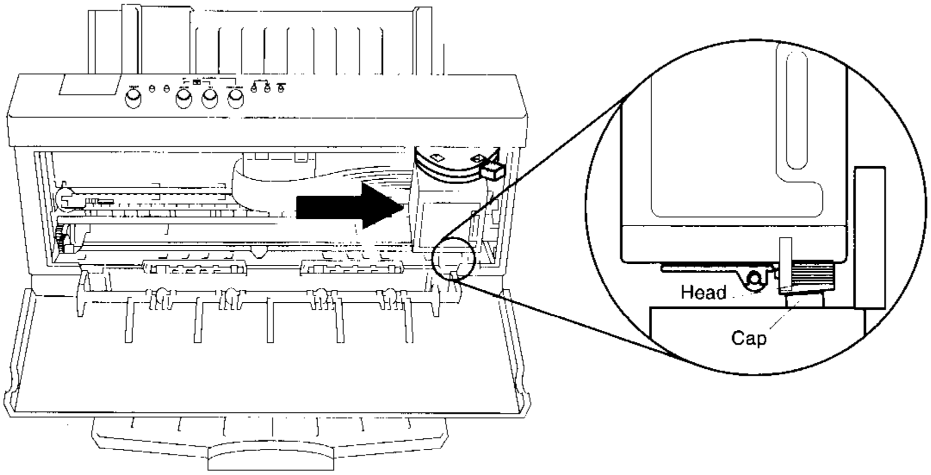


Figure 1-9 Capping Position

2.3 Precautions when Servicing

a) Carriage guide frame mounting position

The printer mechanism has a carriage guide frame for adjusting the head gap between the BJ cartridge and print paper to ensure good print quality. The screws holding the carriage guide frame are painted in black to distinguish them from other screws so the frame will not be moved by mistake. Take special care not to change the carriage guide frame position by mistake when disassembling or reassembling the printer.

REF. If you change the carriage guide frame position by mistake, readjust the head gap as described in *Part 4: Maintenance* of this manual.

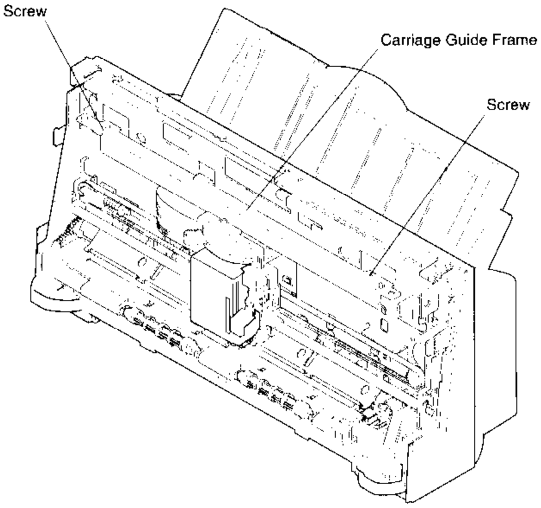


Figure 1-10 Head Gap Adjustment

b) Releasing plastic hooks

The printer contains many plastic parts. Be careful not to bend or break any plastic hooks when disassembling the printer.

CAUTION For precision most of the plastic parts are made of hard, rigid, plastic containing glass fiber, so the plastic hooks break very easily. Use a precision screwdriver or tweezers for disassembly or reassembly, and do not use excessive force to release a hook. For details of the disassembly procedure and the parts that require attention, see the illustrations in the separate *Parts Catalog.*

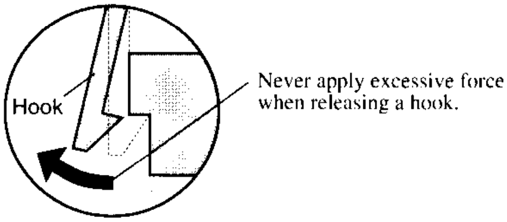


Figure 1-11 Releasing a Hook

c) Damage by static charge

The static charge on your body, produced by your clothes rubbing, can damage electronic components or change their electrical characteristics. To prevent such damage, do not touch the logic card when disassembling or servicing the printer.

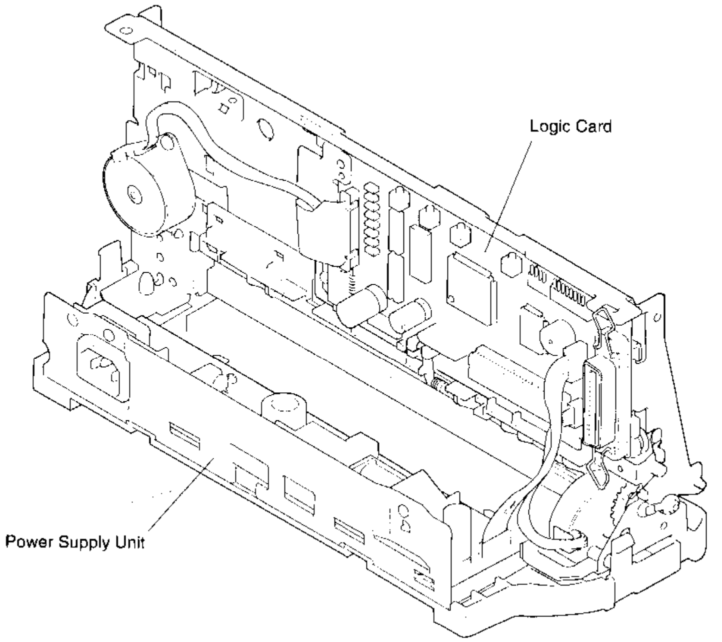


Figure 1-12 Electronic System of the Printer

3. PROTECTIVE FUNCTIONS

3.1 Protective Functions for BJ Cartridge

The printer has functions to protect the BJ cartridge that consists of a print head and ink.

If a BJ cartridge is not installed, the protection functions other than power-off are ineffective.

a) Capping function

The printer caps the cartridge nozzles with the purge unit cap after the carriage returns to in front of the purge unit. This prevents the cartridge drying up, ink leaking, and dust adhering.

NOTE In capping, the carriage moves to its home position if there has been no data for two seconds, wipes 60 seconds after the previous wiping, and caps 60 seconds after that. The nozzles are capped if there has been no data for more than 12 seconds when the printer is not printing or if the power is turned off with the power key. If the nozzles are not capped, they may get clogged by the ink drying up, or ink may leak from the BJ cartridge.

b) Maintenance jet function

The printer has a maintenance jet function that flushes ink from all the cartridge nozzles to the purge unit to prevent the nozzles getting clogged and to ensure stable printing.

NOTE The maintenance jet function works automatically when the power is switched on, during printing every 12 seconds or more, (or every 13 seconds during reverse printing), during wiping, after feeding paper, when the recovery operation ends, and when the cap is opened or closed.

c) Cleaning function

To maintain the print quality, the printer has a cleaning function that wipes dust off the BJ cartridge nozzle surfaces with a head wiper and fills the nozzles with fresh ink.

NOTE Cleaning is done automatically (*) or invoked when the user presses keys (**) if a print defect, such as blurred letters, occurs.

*

Wiping is done automatically when the power is switched on, when the power is switched off, during printing (every 60 seconds or after about 3000,000 dots or more have been printed), after feeding paper, when the recovery operation ends, and when the cap is opened or closed. Cleaning by wiping is done for about 13 seconds when the printer is switched on, after the cartridge is replaced, when the printer is first switched on more than 72 hours after the last cleaning operation with the AC power connected, and when paper is fed or delivered.

**

Cleaning is invoked by holding down the *ON LINE* and *PRINT MODE* keys when the printer is online or offline.

4. BUILT-IN SELF-TEST FUNCTION

The printer has a self-test function to uncover hardware failures. The result of the self-test is indicated by an indicator and the beeper. For details, see *Part 2: Operating Instructions* of this manual.

1. PRINTER SETUP

1.1 Unpacking

After unpacking, check that you have the following:

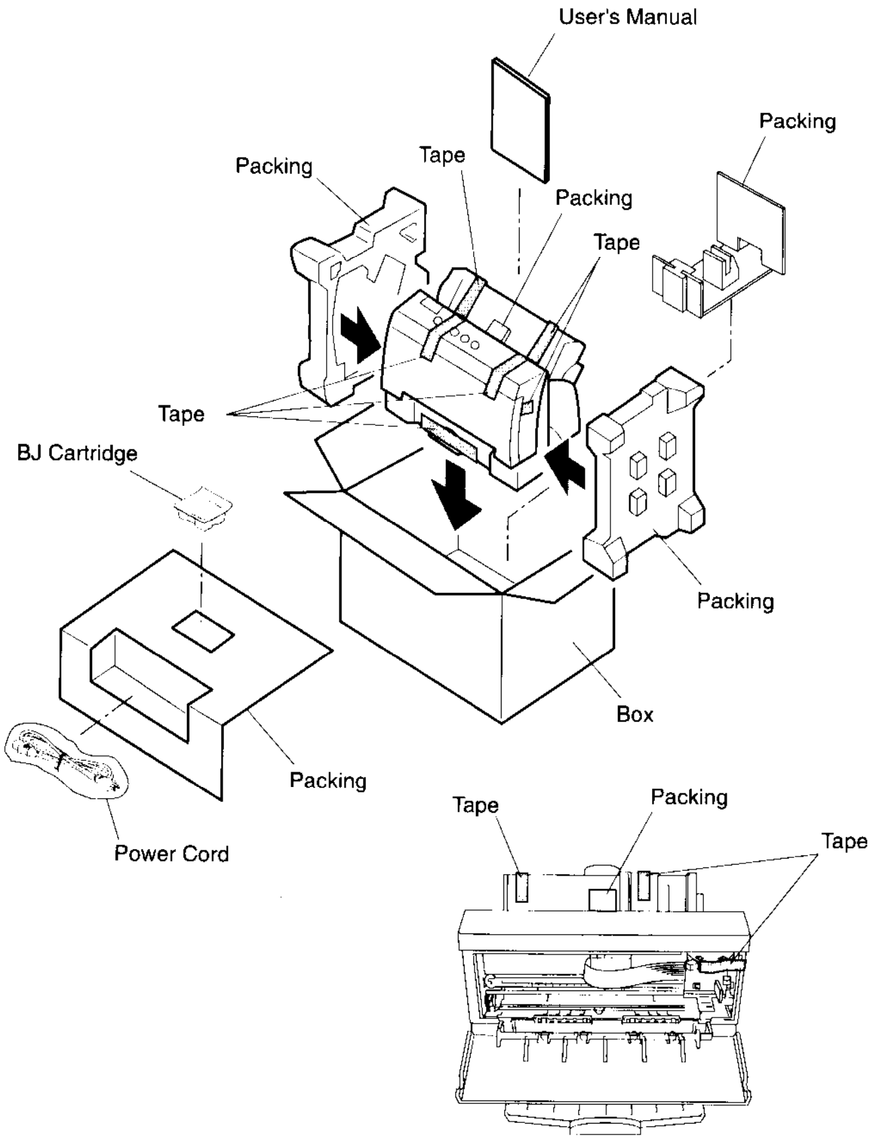

User's Manual
Packing
Packing
Tape
Packing
Tape
Tape
BJ Cartridge
Packing
Box
Packing
Power Cord
Tape
Packing
Tape

Figure 2-1 Packing Arrangement

1.2 Instration Space

The space required to install the printer is shown below.
The clearances given are necessary for the printer to be operated easily.

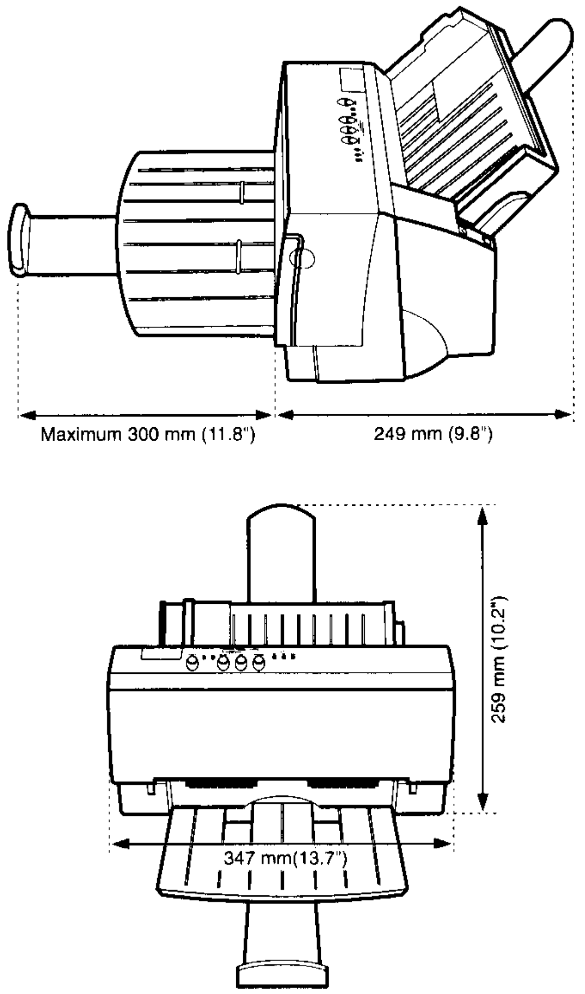

Maximum 300 mm (11.8")
249 mm (9.8")
259 mm (10.2")
347 mm(13.7")

Figure 2-2 Printer Location

Install the printer somewhere in accordance with *4, SPECIFICATIONS*, in *Part 3, TECHNICAL REFERENCE.* Do not install the printer in the places shown below, otherwise it may not work properly.

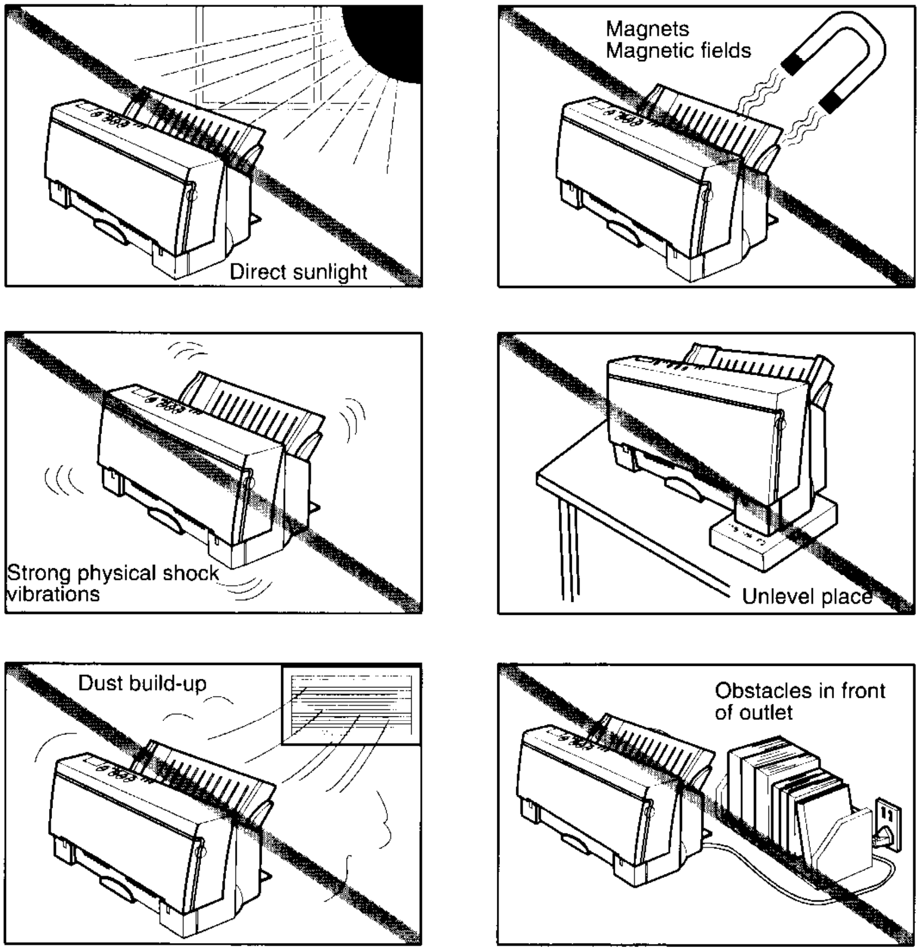
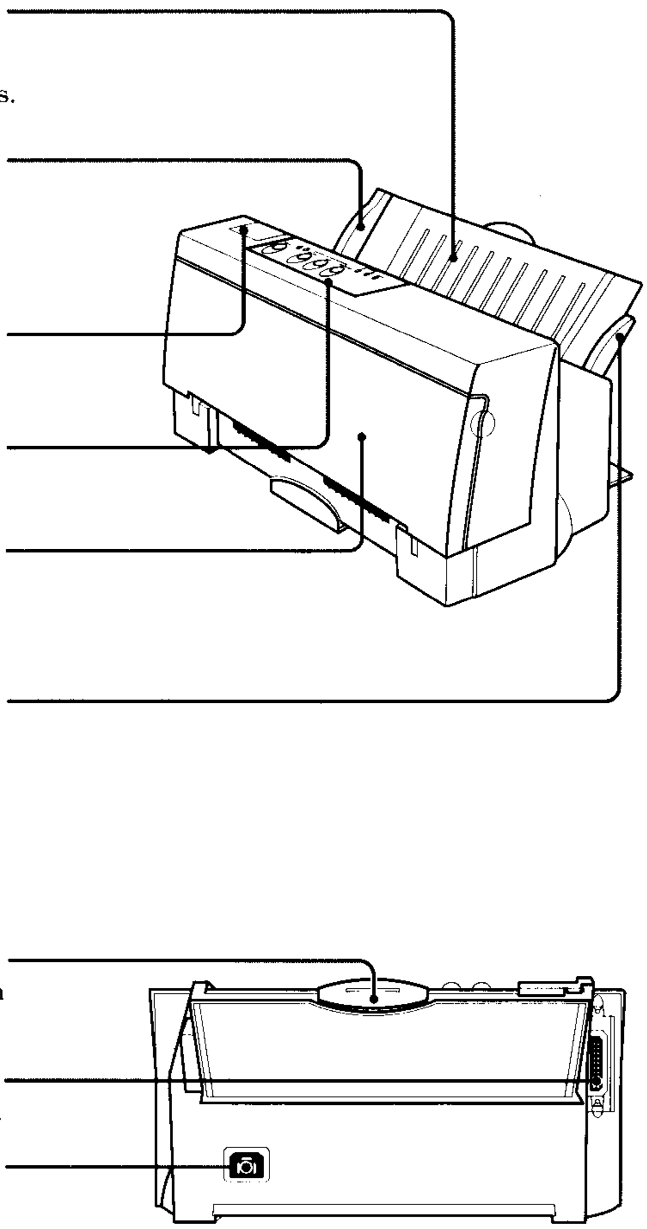

Direct sunlight
Magnets
Magnetic fields
Strong physical shock
vibrations
Unlevel place
Dust build-up
Obstacles in front
of outlet

Figure 2-3 Bad Installation Places

1.3 Names of Parts and Their Functions

The names of the different parts of the printer and their main functions are given below.



Sheet feeder
Automatically feeds about 100 cut sheets (75 g/m) or manually feeds^{2}single sheets.

Paper guide
Aligns cut sheets in the sheet feeder and adjust to a paper width of up to 9.5" (240mm).

Function selector
Changes the printer default settings.

Control panel
See the next page.

Front cover
Covers the internal components of the printer.

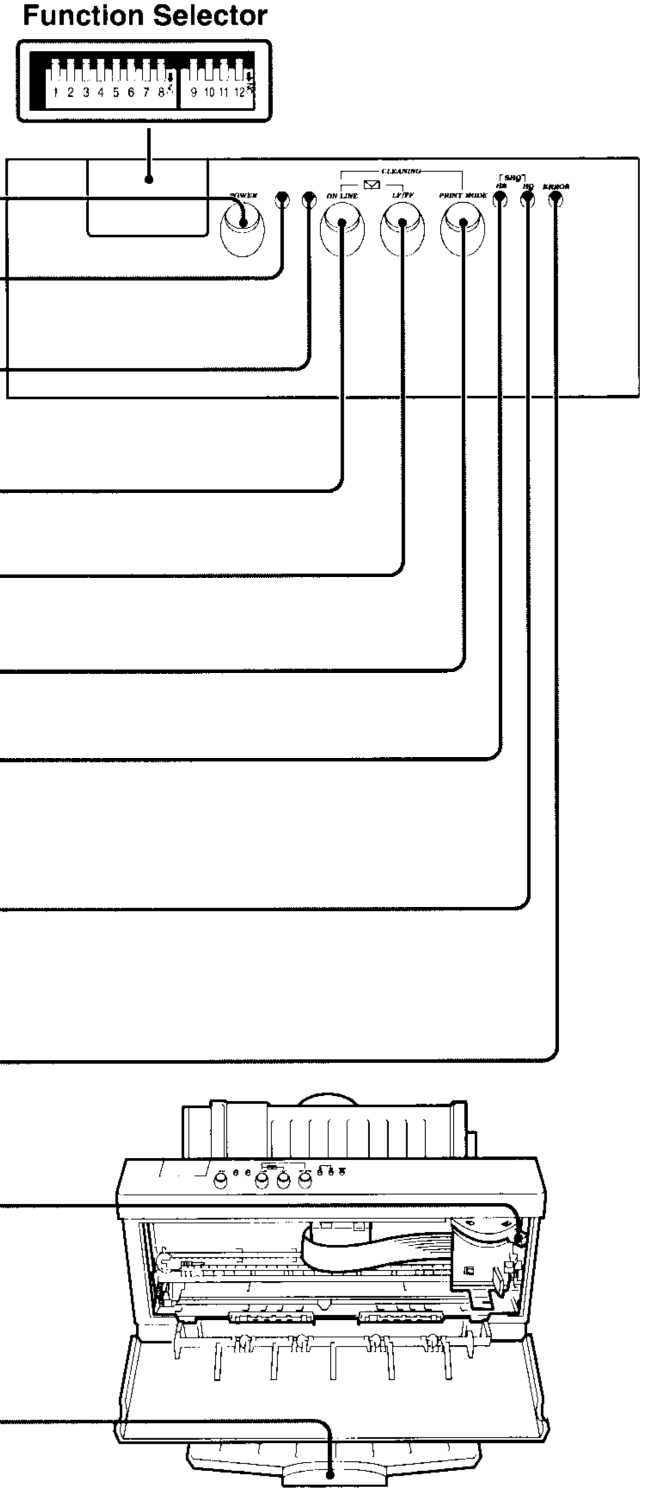
Paper selection lever
Adjust the printer to handle the paper beingused,For plain paper, set this lever to the rear.
For envelopes and thick paper, set the lever to the front.

Paper support
Helps keep paper straight in the sheet feeder.

Interface connector
Receives the interface cable.

Power inlet
Receives the power cord.

Figure 2-4 Names of Parts and Their Functions (1)



Control Panel

POWER key
Turns the printer on or off.

POWER indicator
Indicates the power printer on.

ON LINE indicator
Lights while the printer is online indicating the printer is ready to print.

ON LINE key
Put the printer online or offline.

LF/FF key
Feeds paper a line or a page at a time.

Print Mode key
Selects the print quality/speed .

HS indicator
Lights on its own while the HS print mode is selected or lights with the HQ indicator while the SHQ print mode is selected.

HQ indicator
Lights while selecting the "HQ" print mode or lights with HS indicator while selecting the "SHQ" print mode.

ERROR indicator
Lights when the paperruns out or jammed.

Paper-thickness adjustment lever
Adjusts the distance between the print head and paper.

Paper-exit support
Supports the printed cut sheets legal size.

Figure 2-5 Names of Parts and Their Functions (2)

1.4 Installation Procedure

Install the printer as follows:

1) Removing BJ cartridge protectors

Take the BJ cartridge out of its pack, and remove the head cover and sealing tape protecting the nozzles.

CAUTION To prevent the nozzles from clogging, do not touch or wipe them.

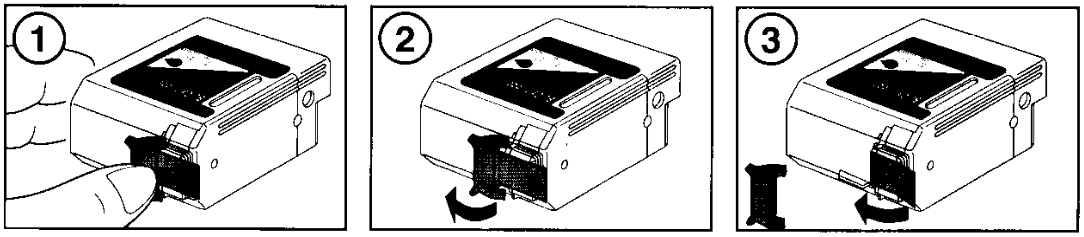


Figure 2-6 Removing Cartridge Protectors

2) Installing BJ cartridge

Open the printer cover, lift the cartridge lock lever, mount the BJ cartridge on the carriage, and return the lever.

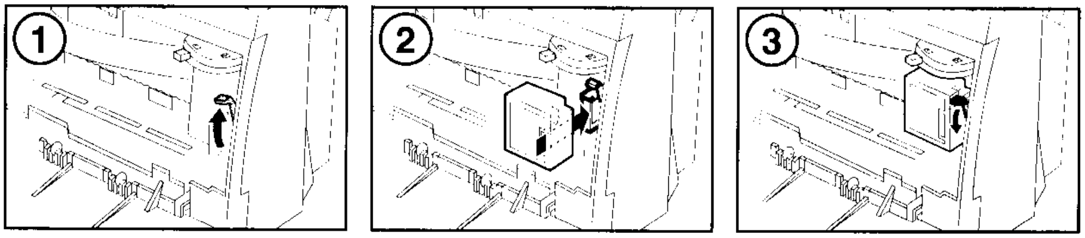


Figure 2-7 Installing BJ Cartridge

CAUTION Use a genuine BJ cartridge in the printer to ensure consistently good printing. There are two types of BJ cartridge:BC-01 and BC-02 . To ensure top printer performance, use the BC-02. Canon does not guarantee the print quality if the BC-01 with is used, which may cause low print density and poor print quality.
However,using the BC-01 will not damage the printer or the cartridge.

3) Connecting interface cable

Switch the printer and computer off. Plug one end of the interface cable into the printer, securing the connector with the connector clips. Plug the other end of the cable into the computer, securing the connector with the thumbscrews.

NOTE The printer has no ground terminal.

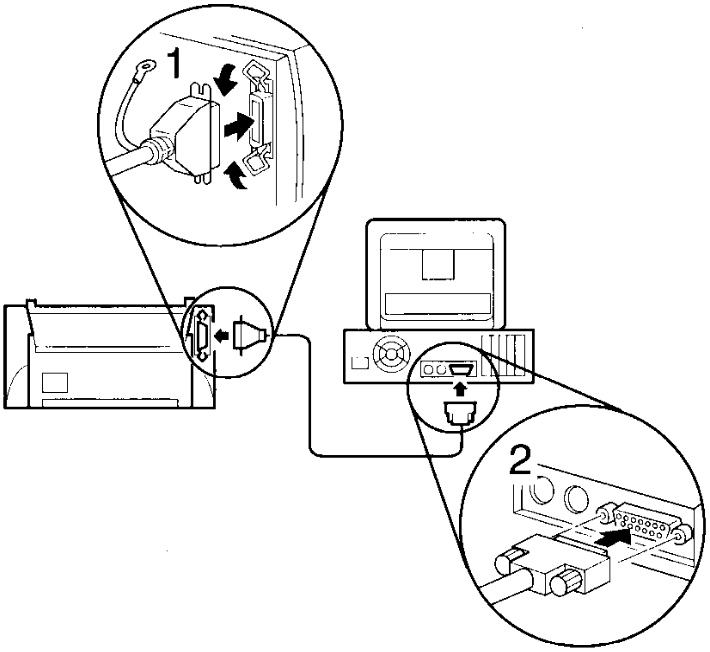


Figure 2-8 Connecting Interface Cable

4) Powering on and off

To power your system up, first switch the computer on, then the other peripherals, and finally the printer. To power down, first switch the printer off, then the other peripherals, and finally the computer.

1.5 Power-On/Power-Off

1) Power-on

After the power cord has been plugged into the printer, the printer can be switched on by pressing the *POWER* key; the printer will then perform the initial operation. When the printer is switched on for the first time after installing a BJ cartridge, cleaning automatically takes place. It takes about 24 seconds, during which time the online indicator flashes.

2) Power-off

To switch the printer off, press the *POWER* key. The printer will start the power-off sequence to cap the BJ cartridge.

NOTE Do not pull the power cord out to turn the printer off. If you do, the BJ cartridge will not be capped, causing ink to leak or the nozzles to dry up.

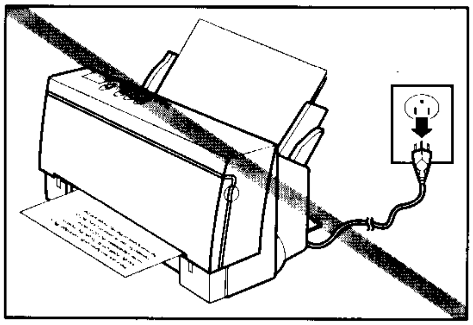


Figure 2-9 Wrong Way for Power Off

NOTE The power off sequence starts and the BJ cartridge is removed when the *POWER* key is pressed, even if an error has occurred. Any errors that occur after the power off sequence begin are ignored.
If the power is switched off during cleaning, the *POWER* indicator flashes until cleaning ends, then the printer caps the BJ cartridge.

2. MOVING THE PRINTER

NOTE When carrying or transporting the printer, leave the BJ cartridge in. If you remove the cartridge before transporting the printer, the ink nozzles may dry up and the BJ cartridge become unusable.

2.1 Carrying the Printer

Before carrying the printer, do the following:

1) Press the *POWER* key to turn the printer off. (The *POWER* indicator will go off.)
2) Close the printer covers.
3) Unplug the interface cable.
4) Unplug the power cord.

2.2 Transporting the Printer

Before transporting the printer, do the following:

1) Switch the printer off and unplug the cords.
2) Open the front cover, move the carriage to the right end of the printer and tape it there, then close the covers.
3) Pack the printer in its original packing materials. (See page 2-1.)

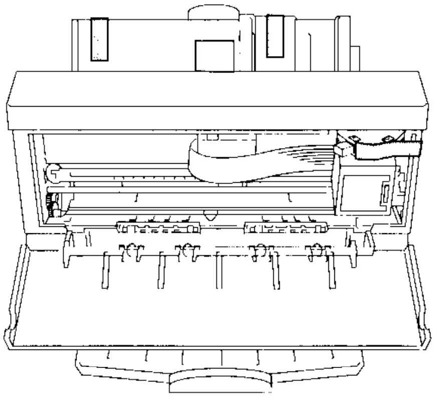


Figure 2-10 Securing Carriage

NOTE If you have thrown the original packing materials away, pack the printer with plenty of shock absorbing material.

3. FUNCTION SELECTOR

3.1 Function Selector

The operating characteristics of the printer can be set up with the DIP switch function selector. The function selector switches are all set off at the factory.

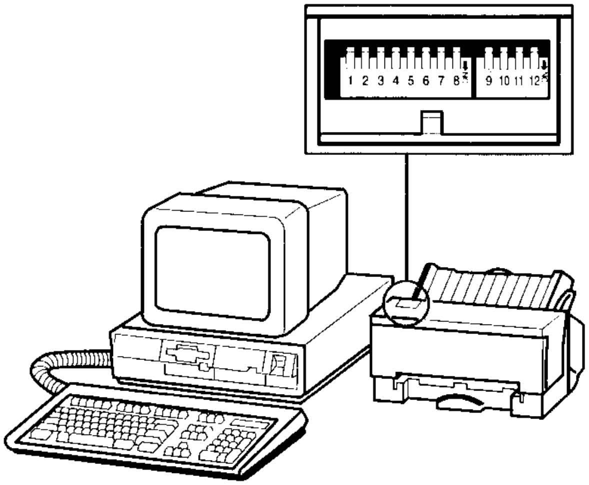


Figure 2-11 Function Selector

TABLE 2-1 BJ-10 OPERATING CHARACTERISTICS

DIP Switch 12=OFF

Switch	Function	Up (Off)	Down (On)	Factory setting
1	Print start position	Letter, envelope	A4	Off
2	Text scale	Disabled	Enabled	Off
3	(Unused)	...	...	Off
4	Page length	11 inches	12 inches	Off
5	Character set	Set 1	Set 2	Off
6	Automatic recovery	Line feed=LF	Line feed=LF+CR	Off
7	AGM mode	Normal	AGM	Off
8	(Unused)	...	...	Off
9	Code page	437	850	Off
10	Buffer	Receive 49 KB Download 0 KB	Download 9 KB Receive 40 KB	Off
11	(Unused)	...	...	Off

TABLE 2-2 LQ MODE OPERATING CHARACTERISTICS

DIP Switch 12=ON

Switch	Function	Up (Off)	Down (On)	Factory setting
1	Print start position	Letter, envelope	A4	Off
2	Text scale	Disabled	Enabled	Off
3	(Unused)	...	...	Off
4	Page length	11 inches	12 inches	Off
5	Character set	Italics	Graphics	Off
6	International character set	Table 2-3		Off
7				Off
8				Off
9	Font	Table 2-4		Off
10				Off
11				Off

TABLE 2-3 TYPEFACE

Country	Swich 9	Swich 10	Swich 11
Roman	Off	Off	Off
Sans Serif	Off	Off	On
Draft	Off	On	Off
Courier	Off	On	On
Prestige	On	Off	Off
Script	On	Off	On
Orator	On	On	Off
Orator-S	On	On	On

TABLE 2-4 INTERNATIONAL CHARACTER SET

Country	Swich 9	Swich 10	Swich 11
USA	Off	Off	Off
UK	Off	Off	On
Germany	Off	On	Off
France	Off	On	On
Denmark	On	Off	Off
Sweden	On	Off	On
Italy	On	On	Off
Spain	On	On	On

4. PRINTER SERVICE FUNCTIONS

4.1 Error Display

The printer signals errors with the five indicators and the beeper.

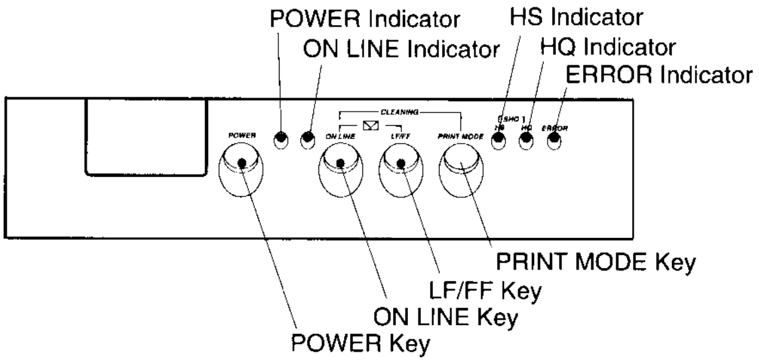

POWER Indicator
ON LINE Indicator
HS Indicator
HQ Indicator
ERROR Indicator
CLEANING
POWER
ON LINE
LF/FF
PRINT MODE
HS
HQ
ERROR
PRINT MODE Key
LF/FF Key
ON LINE Key
POWER Key

Figure 2-12 Control Panel

TABLE 2-5 ERROR DISPLAY

Error	POWER	ON LINE	HS	HQ	ERROR	Beeper
Paper pick-up error	...	...	...	...	Lit	Three beeps
Paper jam	...	...	...	...	Lit	Four beeps
Carriage control error	...	Flashing	Flashing	Flashing	Lit	Three beeps
Cleaning error	...	Flashing	Flashing	Flashing	Lit	Four beeps
Temperature sensor error	...	Flashing	Flashing	Flashing	Lit	Five beeps
ROM/RAM error	...	Flashing	Flashing	Flashing	Lit	Six beeps

4.2 Control Key Service Functions

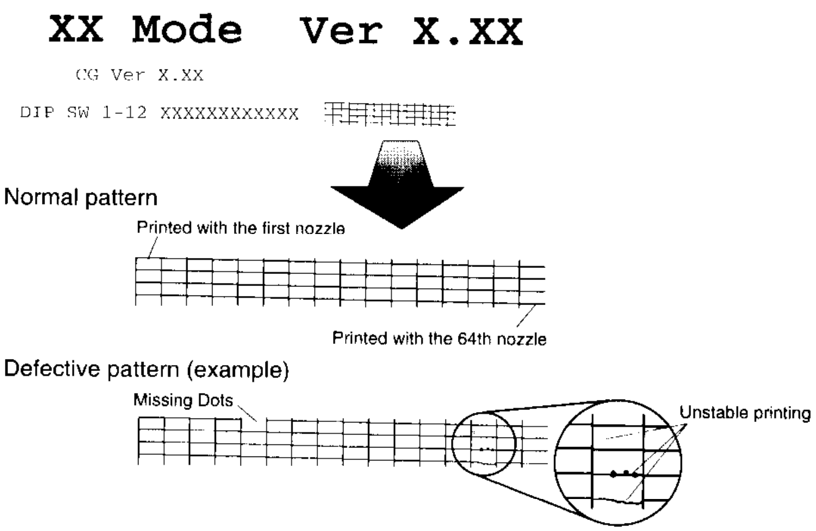
Service functions such as BJ cartridge cleaning and offline testing can be invoked with the four control keys on the printer.

4.2.1 BJ Cartridge cleaning

If the printer is switched on while the *ON LINE* and *PRINT MODE* keys are being held down, the *ON LINE* indicator begins flashing and the BJ cartridge is cleaned.
The printer wipes dust off the BJ cartridge nozzle surfaces with a head wiper and fills the nozzles with fresh ink to maintain print quality.

NOTE If there is print paper in the printer, it is ejected before cleaning starts.

NOTE If an ANK all-mode pattern or ASCII character pattern is printed after cleaning, a nozzle test pattern is printed in the header. If the pattern is blurred or unstable, clean again. If the print defect persists after cleaning five times, replace the BJ cartridge.



```
XX Mode  Ver X.XX
CG Ver X.XX
DIP SW 1-12 XXXXXXXXXXXX
```

Normal pattern
Printed with the first nozzle
Printed with the 64th nozzle
Defective pattern (example)
Missing Dots
Unstable printing

Figure 2-13 Nozzle Test Pattern

4.2.2 Auto-Line-Feed Mode

To enter auto-line-feed mode, hold down the *ON LINE*, *LF/FF*, and *PRINT MODE* keys, switch the printer on, and release the keys after the beeper sounds. In auto-line-feed mode, a line feed is generated automatically when CR (carriage return) is sent to the printer. This mode is canceled when the printer is switched off.

4.2.3 Offline test

If paper has been loaded, the printer can perform an offline test without being connected to a computer. If an error occurs during printing, an error message is displayed, offline testing is terminated, and the normal operating mode returns. For details of the error recovery method, see the troubleshooting procedure.

NOTE The function selector setting is valid during the offline test.

The printer control mode, control ROM version, function selector setting, and nozzle test pattern are printed in the header of the ANK all-mode print and ASCII character print. The function selector setting is indicated by a 12-digit number; the first digit indicates switch 1, and the 12th digit, switch 12. Zero means Off;1 means On.

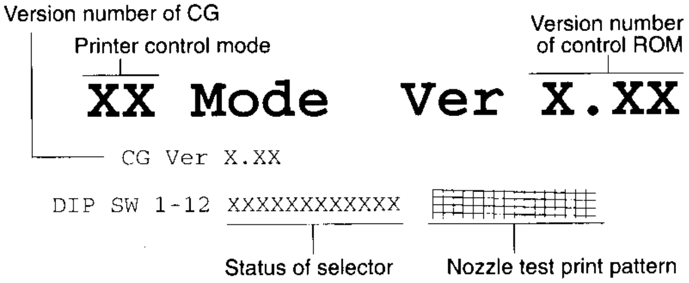


Figure 2-14 Test Print Header

a) ANK all-mode print

If the printer is switched on while the *ON LINE* key is being held down, and the key released after the beeper sounds once, an ANK all-mode pattern is printed. To stop the ANK all-mode print, press the *ON LINE* key or switch the printer off with the *POWER* key.

```
10cpi(Courier) Mode Print
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
pqrstuvwxyz{|}~ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóúñѪº¿⌐¬½¼¡«» ░▒▓│┤╡╢╖╕╣║╗╝╜╛┐└
┴┬├─┼╞╟╚╔╩╦╠═╬╧╨╤╥╙╘╒╓╫╪┘┌█▄▌▐▀αßΓπΣσµτΦΘΩδ∞φε∩≡±≥≤⌠⌡÷≈°∙·√ⁿ²■

12cpi(Prestige) Mode Print
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~Ç
üéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóúñѪº¿⌐¬½¼¡«» ░▒▓│┤╡╢╖╕╣║╗╝╜╛┐└┴┬├─┼╞╟╚╔╩╦╠═╬╧╨╤╥╙╘╒╓╫╪┘┌█▄▌▐▀α
ßΓπΣσµτΦΘΩδ∞φε∩≡±≥≤⌠⌡÷≈°∙·√ⁿ²■

17cpi(Courier) Mode Print
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóúñѪº¿⌐
¬½¼¡«» ░▒▓│┤╡╢╖╕╣║╗╝╜╛┐└┴┬├─┼╞╟╚╔╩╦╠═╬╧╨╤╥╙╘╒╓╫╪┘┌█▄▌▐▀αßΓπΣσµτΦΘΩδ∞φε∩≡±≥≤⌠⌡÷≈°∙·√ⁿ²■

Proportional Mode Print
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
wxyz{|}~ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóúñѪº¿⌐¬½¼¡«» ░▒▓│┤╡╢╖╕╣║╗╝╜╛┐└┴┬├─┼╞╟╚╔╩╦╠═╬╧╨╤
╥╙╘╒╓╫╪┘┌█▄▌▐▀αßΓπΣσµτΦΘΩδ∞φε∩≡±≥≤⌠⌡÷≈°∙·√ⁿ²■

Emphasize Mode print
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
pqrstuvwxyz{|}~ÇüéâäàåçêëèïîìÄÅÉæÆôöòûùÿÖÜ¢£¥₧ƒáíóúñѪº¿⌐¬½¼¡«» ░▒▓│┤╡╢╖╕╣║╗╝╜╛┐└
┴┬├─┼╞╟╚╔╩╦╠═╬╧╨╤╥╙╘╒╓╫╪┘┌█▄▌▐▀αßΓπΣσµτΦΘΩδ∞φε∩≡±≥≤⌠⌡÷≈°∙·√ⁿ²■
```

Figure 2-15 ANK All-mode Pattern

b) H pattern print

If the power is switched on while the *LF/FF* key is being held down, and the key released after the beeper sounds once, an H pattern is printed.
To stop H pattern printing, press the *LF/FF* key or switch the printer off with the *POWER* key.

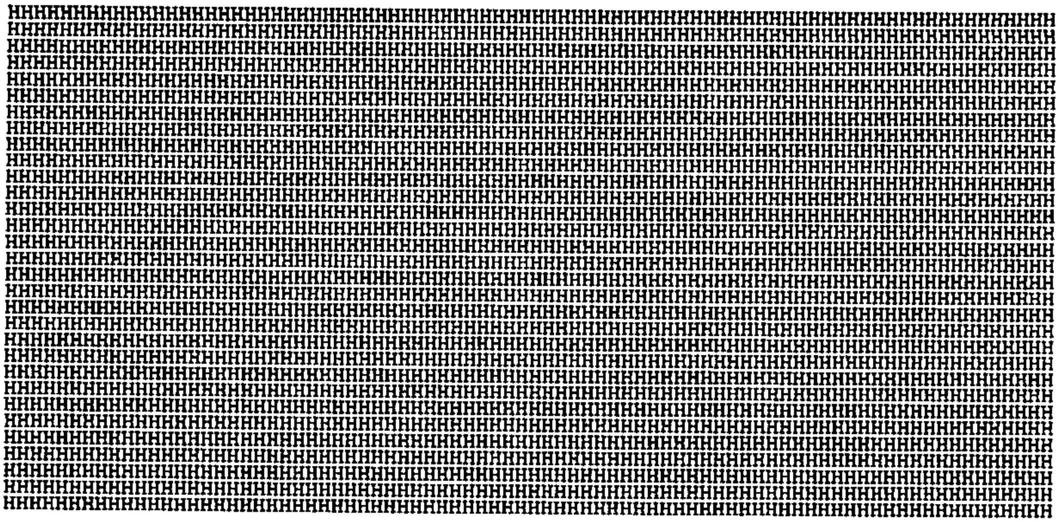


Figure 2-16 H Pattern

c) Dot pattern print

If the power is switched on while the *ON LINE* and *LF/FF* keys are being held down, and the keys released after the beeper sounds once, a dot pattern is printed. To stop dot pattern printing, press the *ON LINE* and *LF/FF* keys or switch the printer off with the *POWER* key.

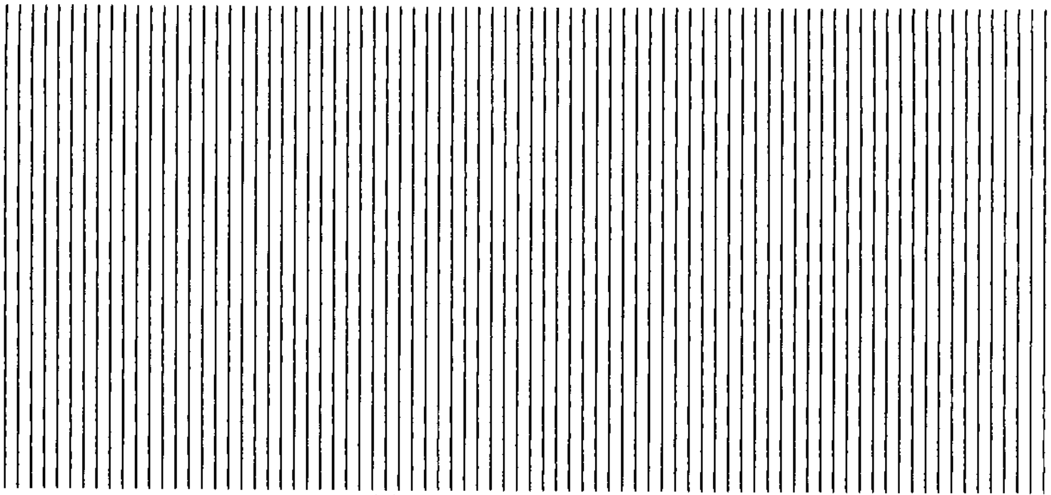


Figure 2-17 Dot Pattern

d) ASCII character print (ripple pattern print)

If the power is switched on while the *ON LINE* and *PRINT MODE* keys are being held down, and the keys released after the beeper sounds once, an ASCII character pattern is printed. To stop the ASCII character printing, press the *ON LINE* and *PRINT MODE* keys or switch the power off with the *POWER* key.

```
 !"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
!"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnop
"#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopq
#$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqr
$%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrs
%&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrst
&'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstu
'()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuv
()*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvw
)*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwx
*+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxy
+,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz
,-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{
-./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|
./0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}
/0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~
0123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~Ç
123456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~Çü
23456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~Çüé
3456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~Çüéâ
456789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~Çüéâä
56789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~Çüéâäà
6789:;<=>?@ABCDEFGHIJKLMNOPQRSTUVWXYZ[\]^_`abcdefghijklmnopqrstuvwxyz{|}~Çüéâäàå
```

Figure 2-18 ASCII Character Pattern

e) Automatic sheet feeder test

If the power is switched on while the *LF/FF* and *PRINT MODE* keys are being held down, and the keys released after the beeper sounds once, the automatic sheet feeder test is performed.

To stop the test, press the *LF/FF* and *PRINT MODE* keys or switch the printer off with the *POWER* key.

NOTE

Demonstration print

If the printer is switched on while the *ON LINE* key is being held down, and the key released after the beeper sounds twice, a demonstration print is produced. The demonstration print is useful for showing what the printer can do. To stop it, press the *ON LINE* key or switch the printer off with the *POWER* key.

4.2.4 ONLINE TEST

a) Hexadecimal dump mode

If the power is switched on while the *PRINT MODE* key is being held down, and the key released after the beeper sounds once, hexadecimal dump mode is entered. In this mode, each byte of data from the computer is printed as hexadecimal data in units of 16 bytes per line. Remaining data less than one line long is printed when the printer is put offline. To exit the mode, switch the printer off with the *POWER* key.

```
20  20  20  20  20  20  20  20  20  20  0D  0A  20  20  20  20
20  20  20  20  20  20  20  20  20  20  20  20  20  20  20  20
20  20  20  20  20  20  20  20  20  20  20  20  20  20  20  20
20  20  20  20  20  20  20  20  20  20  20  20  20  20  20  20
20  20  20  20  20  20  20  20  20  20  20  20  20  20  20  20
20  20  20  20  20  20  20  20  20  20  20  20  0D  0A  2E  20
20  20  20  20  20  20  20  20  20  20  20  20  20  20  2E  2E
20  20  20  20  20  20  20  20  20  20  20  20  20  20  52  45
41  44  20  20  20  20  20  4D  45  20  20  20  20  20  46  52
20  20  20  20  20  20  20  45  5B  45  20  20  20  20  4E  44
44  20  20  20  20  20  20  45  5B  45  20  20  20  20  0D  0A
4E  55  20  20  20  20  20  20  20  45  58  45  20  20  20  20
4E  55  20  20  20  20  20  20  20  48  4C  50  20  20  20  20
44  53  20  20  20  20  20  20  20  45  58  45  20  20  20  20
44  54  20  20  20  20  20  20  20  45  58  45  20  20  20  20
46  46  20  20  20  20  20  20  20  45  58  45  20  20  20  20
0D  0A  4E  43  43  20  20  20  20  20  20  45  58  45  20  20
20  20  4E  43  44  20  20  20  20  20  20  45  58  45  20  20
20  20  4E  49  20  20  20  20  20  20  20  45  58  45  20  20
20  20  51  55  20  20  20  20  20  20  20  45  58  45  20  20
20  20  53  44  20  20  20  20  20  20  20  45  58  45  20  20
20  20  0D  0A  53  46  20  20  20  20  20  20  20  45  58  45
```

Figure 2-19 Hexadecimal Dump Mode (Sample)

1. PRODUCT OUTLINE

1.1 Outline

This section describes the printer and BJ cartridge, options, and consumables.

1.1.1 Printer set

a) Printer

1. Compact desktop size
   External dimensions : 347 mm (13.7") (W) x 193.5 mm (7.6") (D) x 173 mm (6.8") (H)
   Weight (including BJ cartridge) : Approx. 3kg (6 lb 10 oz)

2. Built-in cut sheet feeder

3. High-speed printing (burst)

SHQ mode	: 124 cps (10 cpi)
HQ mode	: 173 cps (10 cpi)
HS mode	: 248 cps (10 cpi)

4. High print quality (360 dpi)

5. Two standard printer control modes
   BJ-10 mode (IBM Proprinter X24E emulation)
   LQ mode (Epson LQ-510 emulation)

6. BJ cartridge (BC-02) for high-speed printing
   Use a genuine BJ cartridge in the printer to ensure consistently good printing. There are two types of BJ cartridge:BC-01 and BC-02. To ensure top printer performance, use the BC-02. Canon does not guarantee the print quality if the BC-01 with is used, which may cause low print density and poor print quality.
   However,using the BC-01 will not damage the printer or the cartridge.

7. Power on/off key
   The printer does not have a mechanical on/off switch that physically connects and disconnects the power. Instead, it has a on/off key that starts up and shuts down printer operation. As long as the printer is plugged in, power is always being supplied to it, even when it has been turned off.

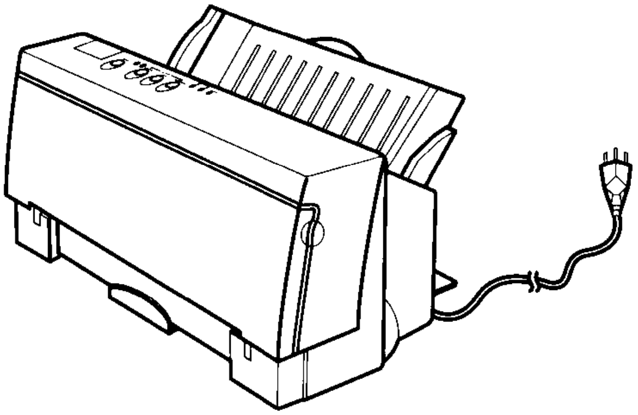


Figure 3-1 Printer

b) BJ cartridge (BC-02)

The disposable BJ cartridge mounted on the printer carriage contains a bubble jet head and an ink cartridge.
The 64-nozzle BJ Cartridge prints on ordinary paper and envelopes with a resolution of 360 DPI. The printer incorporates a purge unit to prevent the BJ cartridge from getting clogged with ink and so maintain high printing and allow easy maintenance.
BJ Cartridge prints about 700,000 characters (HQ mode). If the BJ cartridge (BC-01) is used, the print quality may be impaired.

CAUTION To prevent the ink ejection nozzles of the BJ cartridge from getting clogged, do not touch them or wipe them off. To protect the nozzles, never handle the cartridge without the cartridge protector.

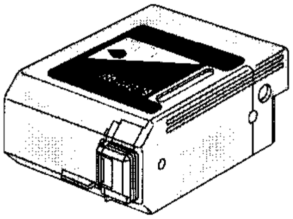


Figure 3-2 BJ Cartridge

c) User's Manual

The User's Manual explains how to use the printer. It describes how to operate the printer, and outlines software commands.

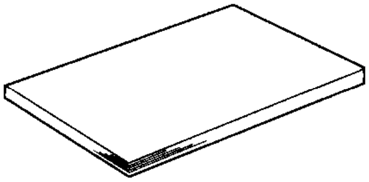


Figure 3-3 User's Manual

1.1.2 Optional components

None

1.1.3 Consumable

a) BJ cartridge

Replacement BJ cartridges are the same as the one supplied with the printer, but the package is different.

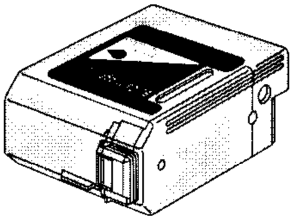


Figure 3-4 BJ Cartridge

2. HARDWARE DESCRIPTION

2.1 Overview of Printer Components

This section outlines the internal components of the printer.

a) BJ cartridge

The BJ cartridge contains the 64-nozzle bubble jet head and ink cartridge. It achieves a resolution of 360 dpi.

b) Purge unit

The purge unit driven by the carriage motor prevents the bubble jet nozzles of the BJ cartridge from getting clogged to maintain high-quality printing.

c) Carriage

The carriage, which is driven by the carriage motor, performs a logical seek operation horizontally to the print paper. Printing signals are transmitted from the logic card to the BJ cartridge mounted on the carriage through a flat ribbon cable.
The paper feed motor is controlled, the paper feed and purge unit are driven, and the cut sheet feeder is controlled.

d) Paper feed/cut sheet feeder

The paper feed part driven by the paper feed motor rotates the feed roller and moves the print paper vertically. Cut sheets up to Letter size can be stacked 10 mm high on the built-in cut sheet feeder and fed automatically. Paper is picked up to the paper feed section by the paper feed motor.
Since the paper feed part of the printer has no paper feed knob for manual feeding, use the control keys to feed paper.

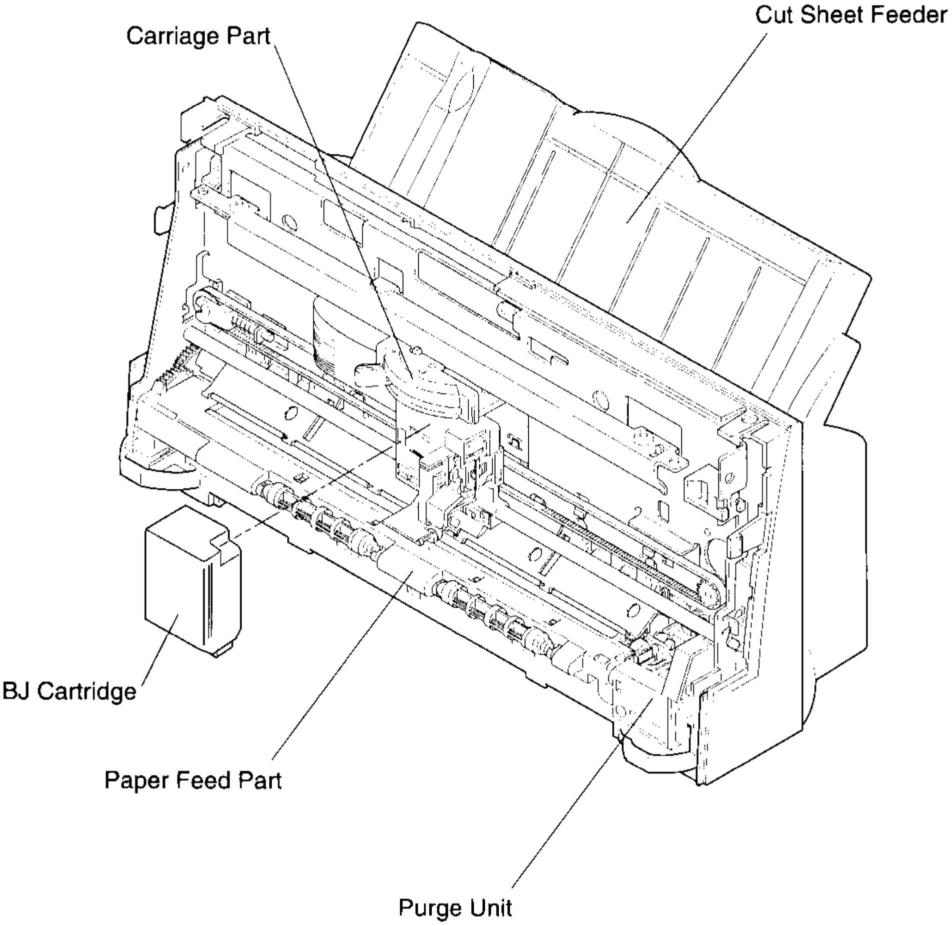

Carriage Part
Cut Sheet Feeder
BJ Cartridge
Paper Feed Part
Purge Unit

Figure 3-5 Printer Mechanism

2.2 BJ Cartridge

2.2.1 BJ cartridge structure

a) Side cover

This plastic cover is fixed to the cartridge body to prevent ink leaking from the ink sponge.

b) Ink sponge

The ink sponge holds black ink, which prints about 450 pages of plain paper.

c) Cartridge body

The plastic cartridge body holds the ink sponge and bubble jet head unit.

d) Bubble jet head unit

The bubble jet head unit feeds ink to the 64 bubble jet nozzles from the tip of the joint pipe that touches the ink sponge. Printing signals are transmitted from the signal contacts.

e) Head cover

The plastic head cover protects the bubble jet head unit.

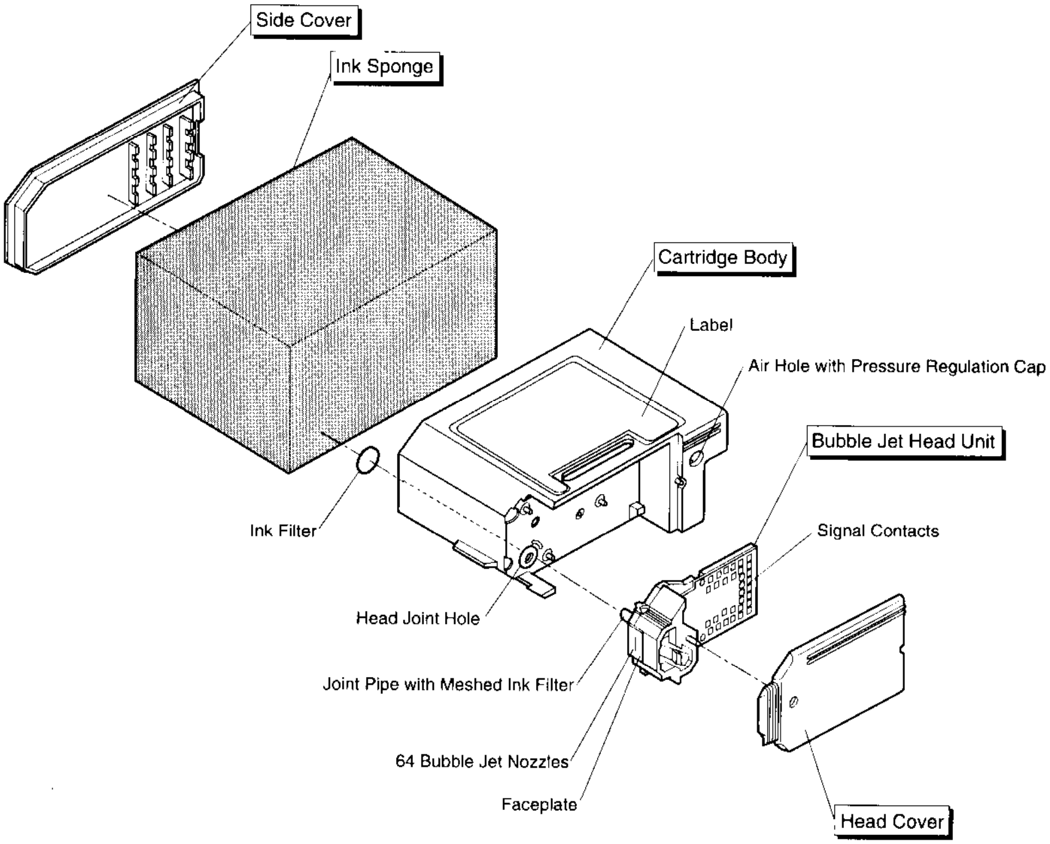

Side Cover
Ink Sponge
Cartridge Body
Label
Air Hole with Pressure Regulation Cap
Bubble Jet Head Unit
Signal Contacts
Ink Filter
Head Joint Hole
Joint Pipe with Meshed Ink Filter
64 Bubble Jet Nozzles
Faceplate
Head Cover

Figure 3-6 BJ Cartridge Structure

2.2.2 Bubble jet head unit structure

a) Bubble jet nozzles

The ink in the ink sponge is filtered by a mesh filter to remove dust, and is fed to the bubble jet nozzles through the joint pipe. When the head drive current flows through the heater plate of a nozzle, the ink boils and bubbles are produced and form into one large bubble. The head drive current is cut off before a drop of ink is ejected from the nozzle, but bubbling continues due to the remaining heat in the heater, and the drop of ink is ejected from the nozzle at about 12 m/s. After ejection, the nozzle is refilled with ink.

NOTE

The heaters and their electrical connections within the bubble jet head are formed on a silicon plate by means of semiconductor technology.
A photosensitive resin layer (nozzle wall) and glass top cover are bonded to the silicon plate, and nozzles are made in the photosensitive resin layer by laser.

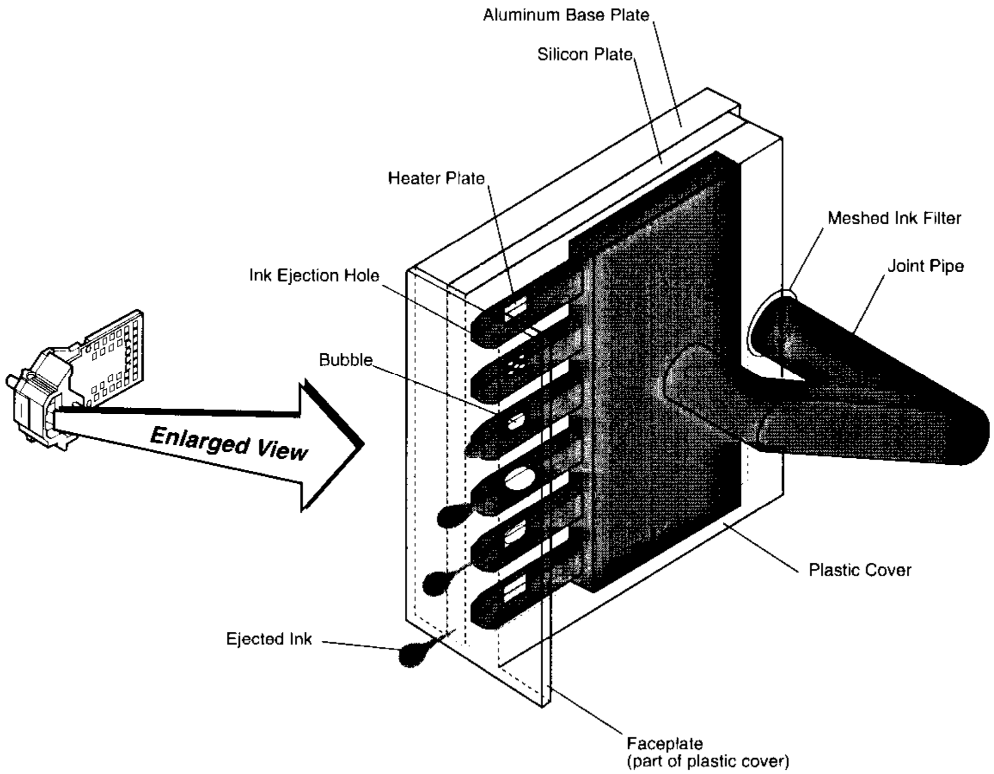

Aluminum Base Plate
Silicon Plate
Heater Plate
Meshed Ink Filter
Joint Pipe
Ink Ejection Hole
Bubble
Enlarged View
Plastic Cover
Ejected Ink
Faceplate
(part of plastic cover)

Figure 3-7 Bubble Jet Head Nozzle (Part)

b) Head rank ID

One of four head rank IDs is selected to correct production variations in the bubble jet head units. The head rank ID is displayed by a PCB pattern of contact points of the bubble jet head unit.

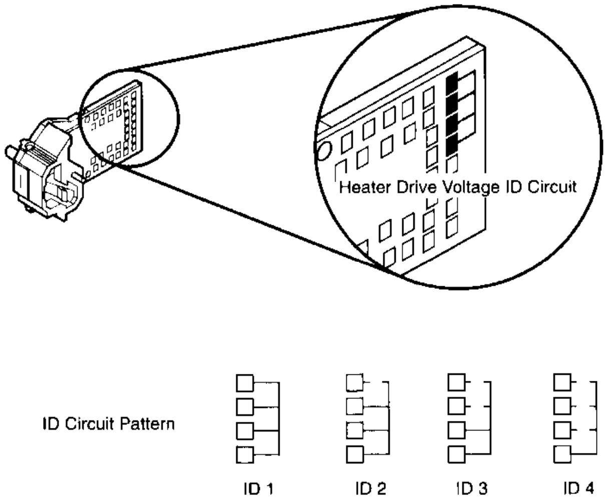
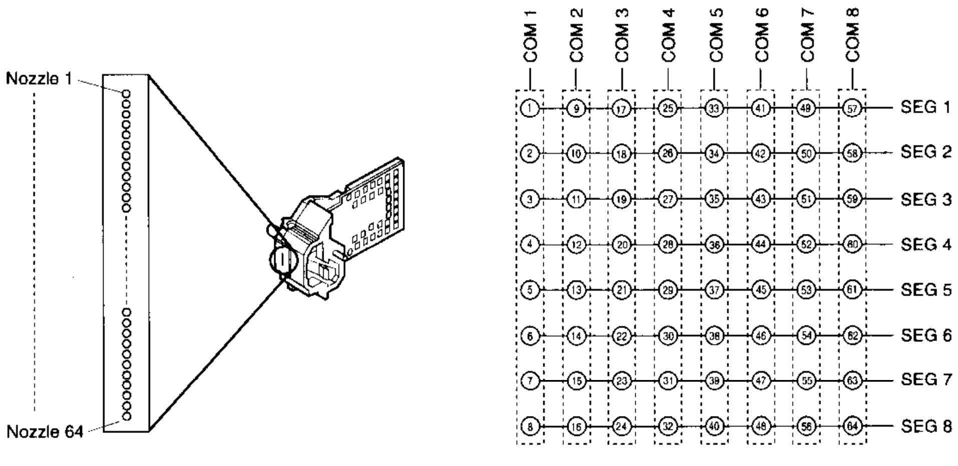


Figure 3-8 Head Rank ID

c) Nozzle arrangement

The 64 bubble jet nozzles are arranged in a line at intervals of 1/360 inch. The 64 heater plates are controlled by the matrix structure of eight COM signal circuits and eight SEG signal circuits.



	COM 1	COM 2	COM 3	COM 4	COM 5	COM 6	COM 7	COM 8
SEG 1	1	9	17	25	33	41	49	57
SEG 2	2	10	18	26	34	42	50	58
SEG 3	3	11	19	27	35	43	51	59
SEG 4	4	12	20	28	36	44	52	60
SEG 5	5	13	21	29	37	45	53	61
SEG 6	6	14	22	30	38	46	54	62
SEG 7	7	15	23	31	39	47	55	63
SEG 8	8	16	24	32	40	48	56	64

Mechanical Nozzle Arrangement

Electrical Nozzle Arrangement

Figure 3-9 Nozzle Arrangement

d) Printing signals

The COM signal connects the COM1 to COM8 circuits to the head drive power supply (VH) in order so that the 64 nozzles are ready to print in units of eight nozzles. The SEG signal connects the SEG circuit (SEG1 to SEG8) of the nozzle to be used for printing to the ground while the COM signal is connected to the head drive power supply, and applies the heater voltage to the heater plate. The load on the power supply unit is reduced and ink charging delay is prevented by driving the head in steps.

The SEG signal increases the head temperature to the appropriate value. A pre-pulse does not eject ink, and a main pulse ejects ink. The head drive pulse controls the pulse width to obtain the optimum print density according to the print speed and temperature.

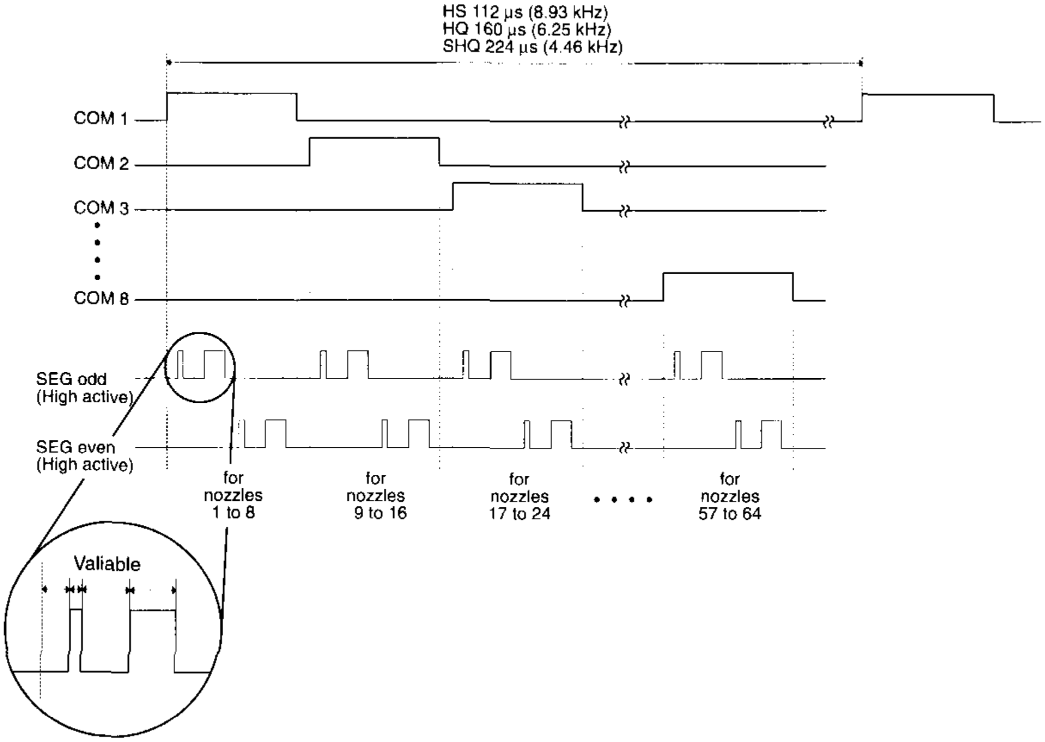

HS 112 µs (8.93 kHz)
HQ 160 µs (6.25 kHz)
SHQ 224 µs (4.46 kHz)
COM 1
COM 2
COM 3
COM 8
SEG odd
(High active)
SEG even
(High active)
for nozzles 1 to 8
for nozzles 9 to 16
for nozzles 17 to 24
for nozzles 57 to 64
Valiable

Figure 3-10 Print Signal

e) Temperature control

The optimum temperature of the BJ cartridge ink for high quality printing is about 23°C (73.4°F). The bubble jet head unit has temperature sensors and warm-up heaters on the silicon plate.
The printer controls the temperature by varying the heat pulse width (pre/main pulse width) of the SEG signal and turning the warm-up heaters on and off. If the ambient temperature detected by the temperature sensor on the printer logic card is 16°C (61°F) or less, the bubble jet head unit nozzles are warmed by the warm-up heaters.

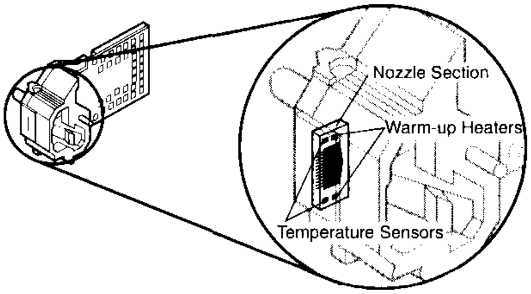


Figure 3-11 Head Temperature Controller

f) Print density control

This printer controls the quantity of ink ejected so it prints at constant density. It does this by predicting the change in head temperature due to printing and using the predicted temperature.
The quantity of ink ejected from the nozzles is controlled to obtain the optimum print density by controlling the heat pulse width (pre/main pulse width) at 50 m/s according to the following: the ambient temperature sensed by the temperature sensor on the logic card; the number of dots printed by the printer; the head temperature predicted from the switch-on time of the warm-up heater; and the head rank ID for correcting production variations of the bubble jet head unit (the heater drive voltage is fixed at 27.6 V dc).

2.3 Purge Unit

2.3.1 Purge unit functions

a) Capping function

The capping function pushes the rubber cap of the purge unit against the face plate (nozzle ink jet opening) of the BJ cartridge to prevent ink from drying up or leaking. When the printer is printing, the carriage moves to its home position two seconds after there has been no data, wipes 60 seconds after the previous wiping, and performs capping 60 seconds after that. When the printer is not printing, the capping occurs if there has been no data for 12 seconds or more.

b) Cleaning function

To maintain high-quality printing with the BJ cartridge, cleaning is done for about 13 seconds, when the printer is first switched on after being plugged in, when the cartridge is replaced, when the printer is first switched on more than 72 hours after the last cleaning operation, and when a key is pressed to start cleaning. To clean, a wiping operation is performed to wipe off paper fiber and ink on the face plate of the BJ cartridge, and a pumping operation is performed to suck about 0.1 cc of ink from the capped BJ cartridge and fill the nozzles with fresh ink.

2.3.2 Purge unit structure

a) Purge unit drive gear

The purge unit drive gear is turned by the feed roller, which is driven by the paper feed motor via the transmission gear, and operates the cam that controls the pumping operation. The cam position is transmitted by the sensor arm and detected by the home position sensor.

b) Wiper unit

The wiper is moved to the position where it does not touch the head and locked when the carriage moves from left to right. The lock is released, and the wiper wipes off the face plate of the BJ cartridge from left to right in the following cases: when the power is turned on; when the power is off and during printing (every 60 seconds or after ink has been ejected for about 3000,000 dots or more); when paper feeding ends; when the recovery operation ends; and when the cap opens and closes.

c) Maintenance jet absorber

The maintenance jet absorber at the home position absorbs the ink ejected from the nozzles for a test to adjust the nozzles in the following cases: when the power is switched on; during printing (every 12 seconds or every 13 seconds during reverse printing); when wiping occurs during printing; when paper feeding ends; when the recovery operation ends; and when the cap opens and closes.

d) Slide lock pin

The slide lock pin advances the rubber cap to perform capping and unlocks the slide arm when the carriage moves from left to right and reaches the recovery operation position. The feed roller power is then transmitted to the purge drive gear and cut sheet feeder.

e) Cap unit

The cap arm with a rubber cap advances and caps the BJ cartridge when the carriage moves from left to right.

The rubber cap connects to the ink pump, and ink is sucked from the BJ cartridge during cleaning. The ink sucked out is absorbed by the waste ink absorber.

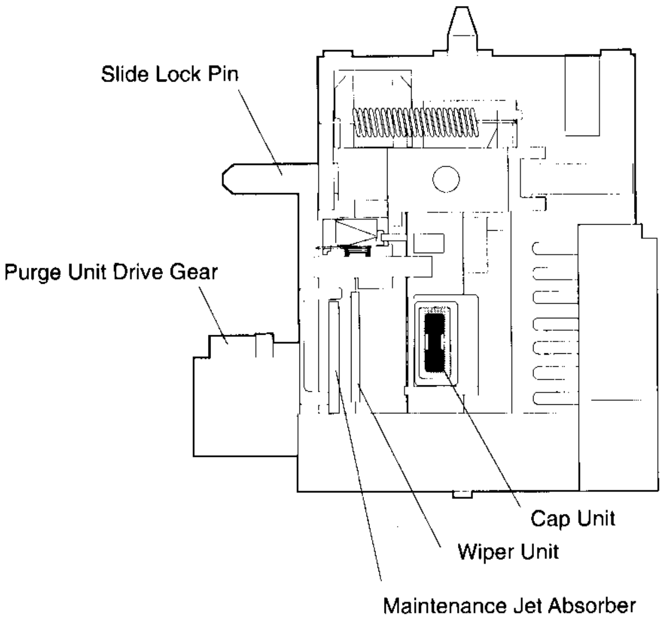

Slide Lock Pin
Purge Unit Drive Gear
Cap Unit
Wiper Unit
Maintenance Jet Absorber

Figure 3-12 Purge Unit

2.4 Carriage Section

2.4.1 Carriage section functions

a) BJ cartridge securing

The carriage secures the BJ cartridge mechanically and connects the electrical circuits.

b) Carriage drive function

The carriage is moved horizontally rotating to the print paper by the carriage motor.

c) Paper thickness change function

The printer can print on envelopes and thick paper by shifting the paper thickness adjustment lever of the carriage.

d) Paper feed motor power change function

The purge unit and cut sheet feeder are driven by the paper feed motor by moving the carriage to the right end and unlocking the slide arm.

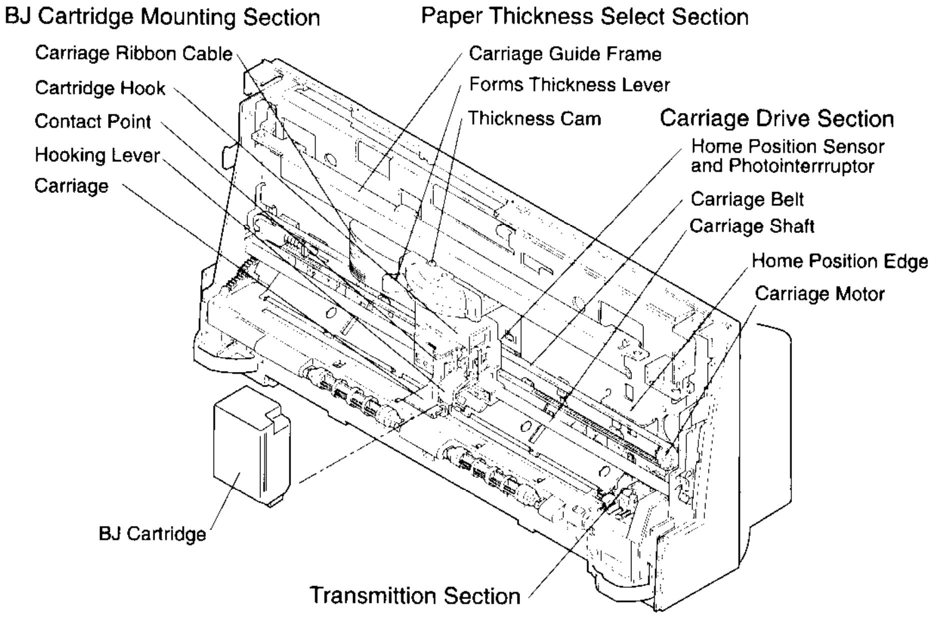

BJ Cartridge Mounting Section
Carriage Ribbon Cable
Cartridge Hook
Contact Point
Hooking Lever
Carriage
Paper Thickness Select Section
Carriage Guide Frame
Forms Thickness Lever
Thickness Cam
Carriage Drive Section
Home Position Sensor and Photointerrruptor
Carriage Belt
Carriage Shaft
Home Position Edge
Carriage Motor
BJ Cartridge
Transmittion Section

Figure 3-13 Carriage Section

2.4.2 Carriage section structure

a) BJ cartridge mounting section

The cartridge hook that is moved with the hook lever secures the BJ cartridge to the carriage. When the BJ cartridge is mounted on the carriage, the contacts of the flat ribbon cable mate with the contacts of the bubble jet head unit to transfer printing signals from the logic card.

b) Carriage drive section

The carriage motor (stepping motor) moves the carriage horizontally relative to the print paper via the drive belt. The carriage position is logically sought on a stepping pulse transmitted to the carriage motor after the photocoupler home position sensor under the carriage detects the home position edge.

The pulse that drives the carriage motor is controlled to the optimum pulse width by the MPU. Printer noise is reduced by controlling the pulse width to the optimum value and reducing drive loss.

The mechanical printing shift during bi-directional printing is corrected automatically by detecting the home position edge during bi-directional printing and shifting the print position by software. The shift is measured when the power is switched on in HQ mode, and before printing in other modes.

c) Paper thickness change function

The paper thickness change function of the carriage prevents damage to the head and stains on print paper due to excessive friction between the head face and print paper when envelopes and thick paper are printed. It does this by providing two positions between the platen and the head face by changing the mounting angle of the carriage guide frame and carriage. It is necessary to change the clearance between the head and paper according to the print paper being used because the print quality improves when the clearance is less position.

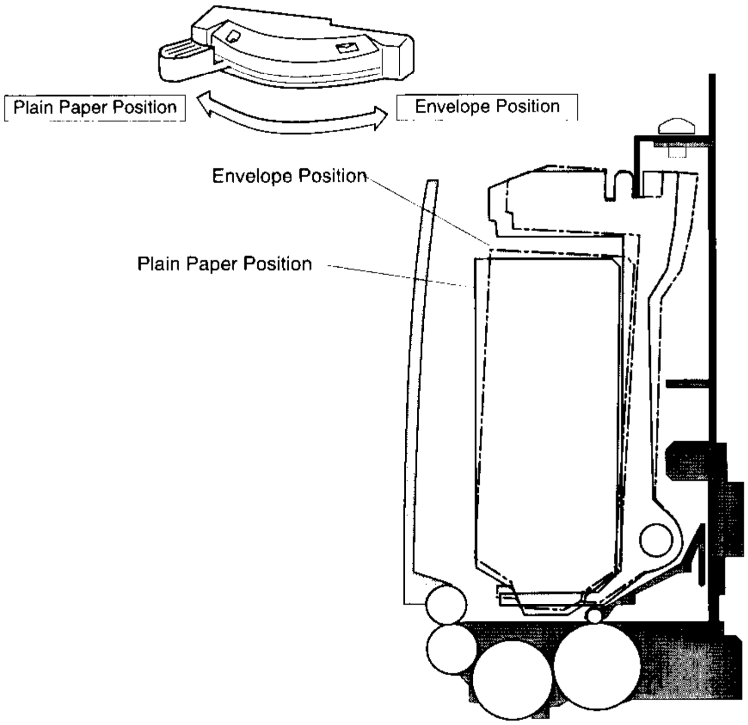


Figure 3-14 Paper Thickness Change Mechanism

d) Paper feed motor power change function

When the carriage is not at the right end, the slide arm is locked by the slide lock pin of the purge unit. Paper is then fed by the feed roller. When the carriage is moved to the capping position and the slide arm is unlocked, the purge unit and cut sheet feeder are driven by the paper feed motor. If the feed roller is turned in the feed direction with the slide arm unlocked, the slide arm swings to the purge drive gear and drives the gear. If the feed roller is turned in the opposite direction with the slide arm unlocked, the slide arm swings to the cut sheet feeder drive gear and drives the gear.

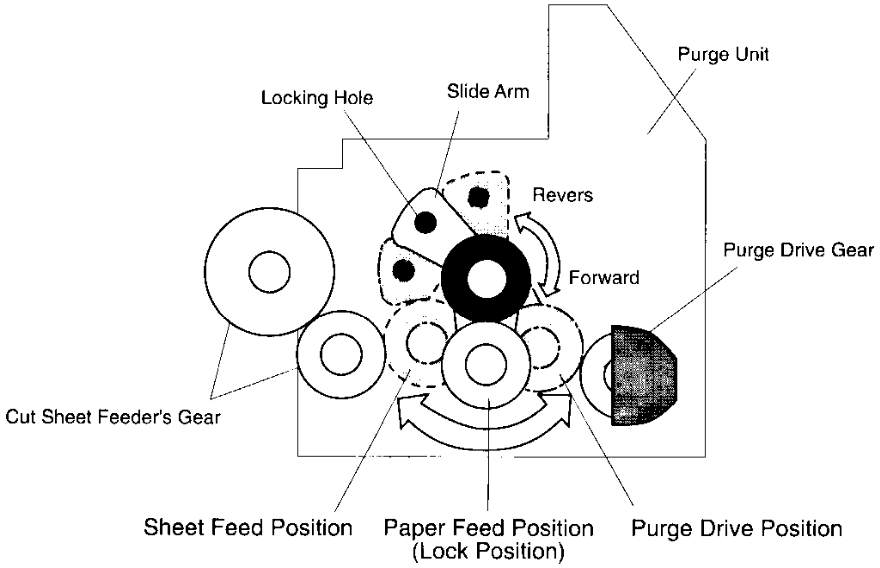

Purge Unit
Locking Hole
Slide Arm
Revers
Forward
Purge Drive Gear
Cut Sheet Feeder's Gear
Sheet Feed Position
Paper Feed Position
(Lock Position)
Purge Drive Position

Figure 3-15 Paper Feed Motor Power Change

2.5 Paper Feed Cut Sheet Feeder

2.5.1 Functions of paper feed/cut sheet feeder

a) Paper feed function

The paper feed section lets you feed cut sheets automatically or manually with the cut sheet feeder. The internal cut sheet feeder can hold cut sheets up to Letter size stacked up to 10 mm and feed them automatically. Cut sheets are picked up and passed to the paper feed section by the paper feed motor.

b) Paper feed operation

Since the paper feed of the printer has no paper feed knob for manual feeding, use the control keys to feed paper.

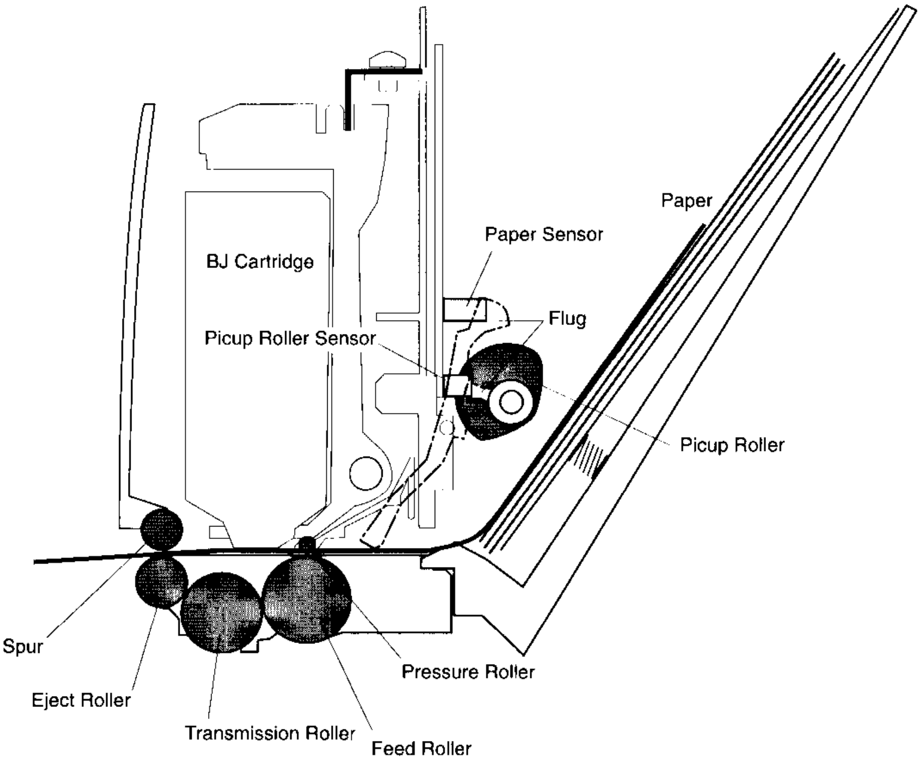

Paper
Paper Sensor
BJ Cartridge
Flug
Picup Roller Sensor
Picup Roller
Spur
Pressure Roller
Eject Roller
Transmission Roller
Feed Roller

Figure 3-16 Paper Feed

2.5.2 Paper feed/cut sheet feeder structure

a) Paper feed function

The paper select lever, interlocked with the corner arm, is used to change the paper thickness position according to the print paper being used. When the lever is set to the plain paper position, print paper is stacked on the corner arm.

When printing starts, paper is driven by the paper feed motor, and a cut sheet is carried to the paper feed section. When printing starts, paper is driven by the paper feed motor, and the initial position of the pickup roller is detected by the photointerrupter-type pickup roller sensor on the logic card. The cut sheet is conveyed to the paper feed section. When the paper is detected by the photointerrupter paper sensor, it is fed to the print start position automatically.

When the lever is set to the envelope (thick paper) position, envelopes are fed in the same way as for the plain paper, except that the envelopes do not touch the corner arm.

Print paper can be fed manually to the paper feed section without touching the corner arm by selecting the envelope position.

When the paper fed to the paper feed section is detected by the paper sensor for at least two second, the paper is picked up and moved to the print start position.

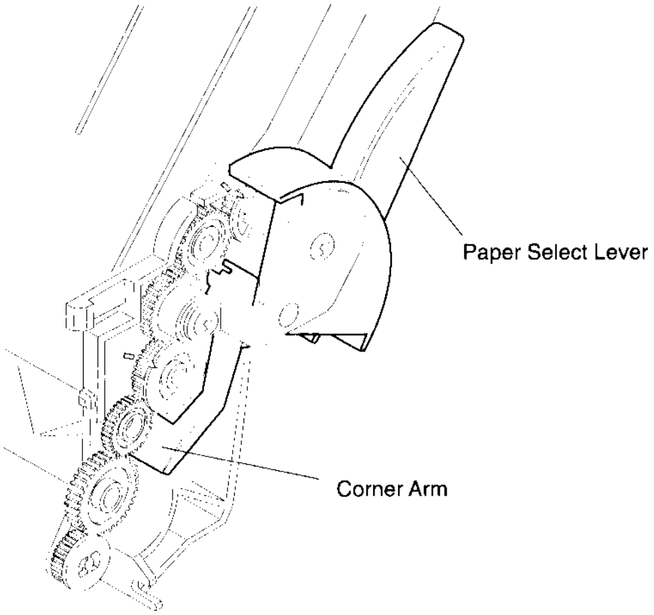


Figure 3-17 Paper Selection

b) Paper feed function

By pressing the *LF/FF* key instead of using the paper feed knob, print paper can be fed in the forward direction in 1/6" or 1/8" steps set by the function selector.

3. ELECTRONIC SYSTEM OF THE PRINTER

3.1 Overview of the Electronic System of the Printer

The electronic system of the printer consists of a logic section and a power supply section. The logic section converts data from the interface to printing signals or printer operation signals, monitors sensor states, and drives the BJ cartridge and motors. The power supply section converts ac power to dc power and supplies it to the logic card and actuators.

When ac power is supplied to the printer, the electronic system is active although the keys other than the power key are ineffective and the interface is not pulled up (disabled).

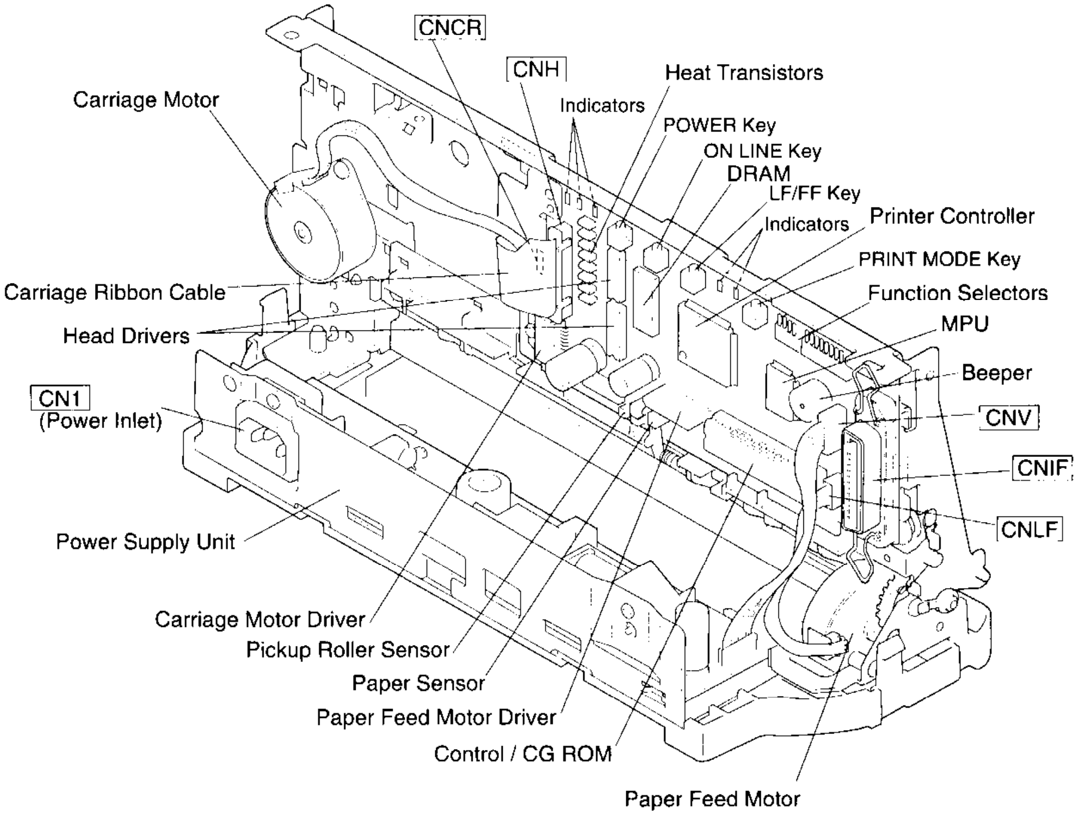

CNCR
CNH
Heat Transistors
Carriage Motor
Indicators
POWER Key
ON LINE Key
DRAM
LF/FF Key
Indicators
Printer Controller
PRINT MODE Key
Carriage Ribbon Cable
Function Selectors
MPU
Head Drivers
Beeper
CN1
(Power Inlet)
CNV
CNIF
CNLF
Power Supply Unit
Carriage Motor Driver
Pickup Roller Sensor
Paper Sensor
Paper Feed Motor Driver
Control / CG ROM
Paper Feed Motor

Figure 3-18 Electronic System of the Printer

3.2 Logic Section

3.2.1 Logic card functions

The logic section consists of a logic card. It has the following functions:

a) Print mechanism control function

The logic card controls the printer mechanism by logical seeking with the paper feed motor (stepping) and carriage motor (stepping) according to the state of the printer mechanism. This state is monitored by the paper sensor, home position sensor, and pick-up roller sensor.

b) Interface function

The logic card receives data from the personal computer through the parallel interface connector, and converts printing data and printer control commands to control the printer.

c) BJ cartridge control function

The logic card controls the maintenance operation for data conversion for printing and optimum printing.

d) Switch detection function

The logic card detects the states of the control keys and function selectors.

e) Indicator control function

The logic card displays the printer operating state by indicators.

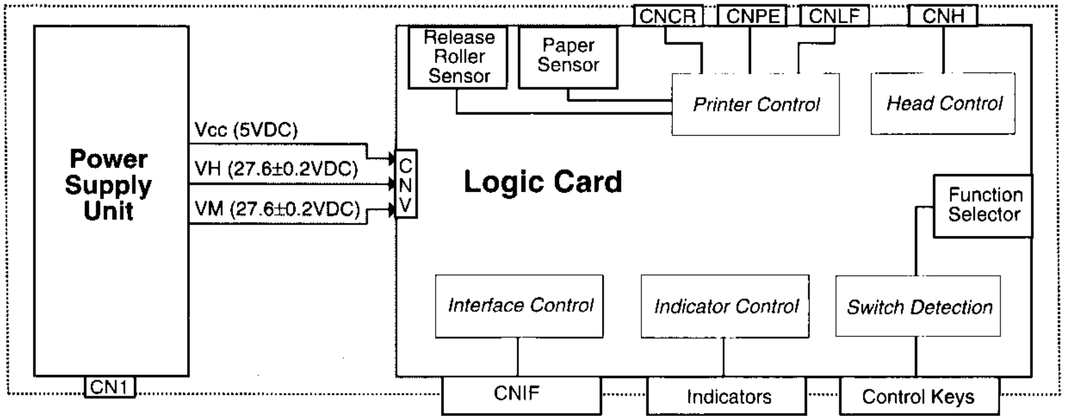

CNCR
CNPE
CNLF
CNH
Release Roller Sensor
Paper Sensor
Printer Control
Head Control
Power Supply Unit
Vcc (5VDC)
VH (27.6±0.2VDC)
VM (27.6±0.2VDC)
CNV
Logic Card
Function Selector
Interface Control
Indicator Control
Switch Detection
CN1
CNIF
Indicators
Control Keys

Figure 3-19 Block Diagram

3.2.2 Logic card block diagram

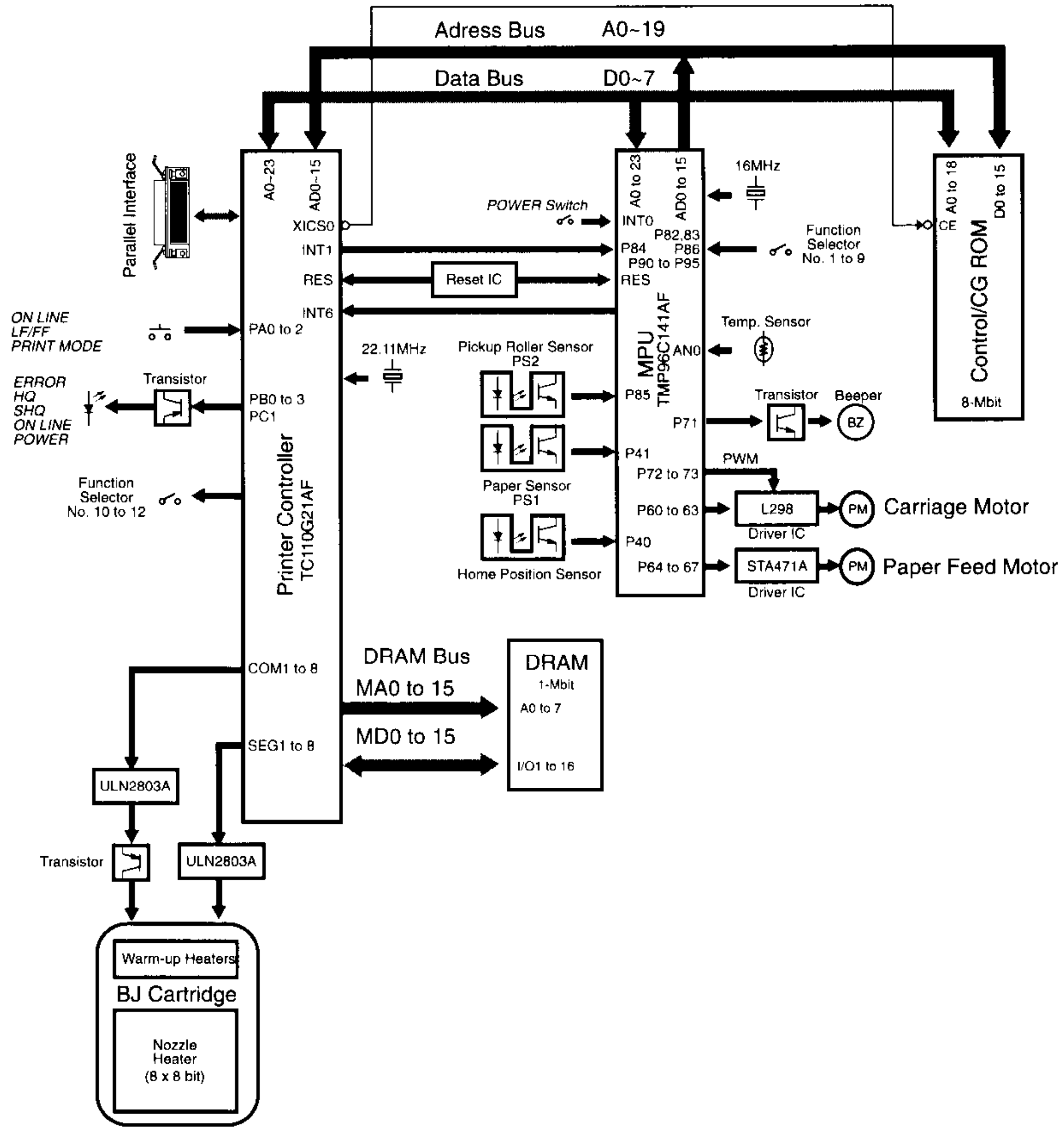

Adress Bus A0~19
Data Bus D0~7
Parallel Interface
A0~23
AD0~15
XICS0
INT1
RES
INT6
PA0 to 2
PB0 to 3
PC1
Printer Controller
TC110G21AF
COM1 to 8
SEG1 to 8
ON LINE
LF/FF
PRINT MODE
ERROR
HQ
SHQ
ON LINE
POWER
Transistor
Function Selector No. 10 to 12
ULN2803A
Transistor
ULN2803A
Warm-up Heaters
BJ Cartridge
Nozzle Heater (8 x 8 bit)
Reset IC
22.11MHz
POWER Switch
Pickup Roller Sensor PS2
Paper Sensor PS1
Home Position Sensor
DRAM Bus
MA0 to 15
MD0 to 15
DRAM
1-Mbit
A0 to 7
I/O1 to 16
MPU
TMP96C141AF
A0 to 23
AD0 to 15
INT0
P82,83
P84
P86
P90 to P95
RES
AN0
P85
P71
P41
P72 to 73
P60 to 63
P40
P64 to 67
16MHz
Function Selector No. 1 to 9
Temp. Sensor
Transistor
Beeper
BZ
PWM
L298
Driver IC
PM
Carriage Motor
STA471A
Driver IC
PM
Paper Feed Motor
CE
A0 to 18
D0 to 15
Control/CG ROM
8-Mbit

Figure 3-20 Logic Card Block Diagram

3.2.3 Control section components

a) MPU

The MPU, a Toshiba TMP96C141F, contains 16-bit CPU, 1-Kbyte work RAM, 24-bit address bus port, 16-bit data bus port, stepping motor controller, interrupt controller, A/D converter, and input/output ports.

- **Built-in CPU**
  The 16-bit CPU operates in synchronization with the 16-MHz external clock input.

- **Address bus**
  The 24-bit address bus port is connected to the 8-Mbit CONTROL/CG ROM and printer controller. The CONTROL/CG ROM is chip-selected by the printer controller in synchronization with the read signal output from the MPU and the 16-MHz clock pulse.

- **Data bus**
  The 16-bit data bus port is connected to the 8-Mbit control/CG ROM and printer controller, like the address bus.

- **Stepping motor controller**
  The stepping motor controller outputs the two-phase signals that drive the carriage motor and paper feed motor. The PWM (pulse width modulation) signal programmed to drive the carriage motor appropriately is output to the carriage motor driver. The driver excites the carriage motor at the timing when the exciting signal and PWM signal overlap.

- **Interrupt controller**
  The power key on/off signal is input to INTO, and the printer controller INIT1 signal is input to INT6 as external interrupt signals to perform interrupt handling.

- **A/D converter**
  The analog signals indicating the temperature sensor on the logic card, presence of BJ cartridge, and detection of type of cartridge are sensed through the built-in A/D converter.

- **Input/output ports**
  The sense signals from the paper sensor, home position sensor, and pick-up roller sensor and settings of function selectors 1 to 9 are input to the input port. The beeper, BJ cartridge detection output, and warm-up heater heat signals are output from the output port.

b) Printer controller

The printer controller using a Toshiba TC110G21AF contains the interface controller, DRAM controller, buffer controller, print head controller, and I/O ports. It operates in synchronization with the 22.11-MHz clock input.

- **Interface controller**

  The Centronics interface controller receives 8-bit parallel data sent from the computer in synchronization with the data strobe pulse by BUSY/-ACK handshaking. It controls other interface signals. The data received from the interface is stored in the receive buffer in DRAM, and is analyzed by the MPU.
  If the printer initialize signal -INIT is input to the printer controller and MPU from the interface, the printer controller outputs the BUSY status immediately, and the MPU prints printing data stored in the print buffer, then initializes the printer.

- **DRAM controller**

  The DRAM controller controls the 1-Mbit DRAM 8-bit address/16-bit data bus, which is independent from the MPU bus, read/write, RAS/CAS, and refresh.

- **Buffer controller**

  The buffer controller automatically writes received data into the receive buffer in DRAM, controls the remaining data in the receive buffer, reads data from the receive buffer, and clears data after reading.

- **Print head controller**

  The print head controller counts the number of dots of the bit map print data read from the DRAM print buffer to control the heat pulse width (pre/main pulse width), converts it to the COM and SEG signals for 8 x 8 matrix printing control, and controls heating of the heater plate of the 64 bubble jet nozzles of the BJ cartridge.

REF. See the section "BJ cartridge" for details of printing signals.

- **Input/output ports**

  The printer controller monitors the states of the *ON LINE*, *LF/FF*, *HQ/HS*, *FONT* keys, ASF sensor, and function selectors 10 to 12 via the input ports, and controls the *POWER*, *ON LINE*, *SHQ*, *HQ*, and *ERROR* indicators via the output ports.

c) DRAM

The 1-Mbit DRAM is controlled by the print controller and used as the receive buffer, font download buffer, two-line print buffer, and work area.

d) Control/CG ROM

The 8-Mbit control/CG ROM contains the printer control program and bit map font data.

e) Reset IC

When the power supply unit provides the voltage from the AC line input, a reset pulse is output to the MPU and printer controller once. It is not output when the power is switched on with the *POWER* key.

3.3 Power Supply Section

3.3.1 Power supply components

The power supply section has the following features:

The power supply section is a self-exciting switching regulator that supplies dc voltages used by the printer from the ac input to the logic card.

3.3.2 Power supply section structure

- **CN1**

  CN1 is a three-terminal ac inlet with a ground terminal.

  The input voltage is 120 V ac (+10%, -15%) for 120V models and 220 V ac or 240 V ac (+10%, -15%) for 220/240 V models.

- **CN3**

  This secondary output of the power supply circuit outputs three voltages: Vcc (5 ± 0.25 V dc) used as the logic drive voltage; VH (27.6 ± 0.2 V dc) used as the heat voltage of the bubble jet head and for the warm-up heater; and VM (27.6 ± 0.2 V dc) used as motor drive voltage. They are protected against overcurrent. If the AC input is present when the *POWER* key is off, these outputs are always supplied.

- **VR**

  This variable resistor changes VH (a secondary output of the power supply), which heats the heater plate of the bubble jet nozzle. It has been factory-adjusted to the standard VH value and paint-locked. It cannot be adjusted in the field. This variable resistor does not need to be readjusted even if the power supply unit is replaced.

4. SPECIFICATIONS

4.1 General Specifications

1. Type	Desk-top serial printer	
2. Paper feed method	Automatic and manual	
3. Sheet feeder capacity		
Plain paper	Max. 10 mm (75 g/m²)	
Envelopes	10 envelopes (Commercial number 10)	
4. Printing speed		
Burst		
SHQ mode	124 cps (10 cpi)	
HQ mode	173 cps (10 cpi)	
HS mode	248 cps (10 cpi) (cps: characters per second) (cpi: characters per inch)	
5. Print direction		
Text	Bi-direction	
Block character	Uni-direction	
Bit image	Uni-direction	
6. Maximum print width	8"	
7. Line feed		
HQ, HS mode	100 ms/line (1/6" line feed)	
SHQ mode	190 ms/line (1/6" line feed)	
8. Built-in print control mode		
BJ-10 mode (IBM X24E)/LQ mode (Epson LQ510)		
9. Line feed pitch (n: programmable)		
BJ-10 mode	1/6", 1/8", n/60", n/72", n/180", n/216", n/360"	
LQ mode	1/6", 1/8", n/180", n/360"	
10. Printable characters		
Fonts	BJ-10 mode	Prestige (12 cpi), Courier (10 cpi)
	LQ mode	Roman, Sans serif, Courier, Prestige, Script (10 cpi, PS), Orator, Orator-S (10 cpi), Draft
Character pitch	BJ-10 mode	10, 12, 17, 20 cpi, PS
	LQ mode	10, 12, 15, 17, 20 cpi, PS
Character configuration		
	HQ, SHQ mode:	36 (horizontal) x 48 (vertical) dots
	HS mode:	18 (horizontal) x 48 (vertical) dots (zigzag line)
Character set		
	BJ-10 mode	IBM character set 1, 2, 3
	LQ mode	Italic character set Graphic character set

11. Number of columns printed

BJ-10 mode	Character type	Pitch	cpl
	Pica	10cpi	80 cpl
	Pica enlarged	5 cpi	40 cpl
	Pica condensed	17 cpi	136 cpl
	Pica condensed-enlarged	8.5 cpi	68 cpl
	Elite	12 cpi	96 cpl
	Elite enlarged	6 cpi	48 cpl
	Proportional spacing	PS	Varies

LQ mode	Character type	Pitch	cpl
	Pica	10cpi	80 cpl
	Pica enlarged	5 cpi	40 cpl
	Pica condensed	17 cpi	136 cpl
	Pica condensed-enlarged	8.5 cpi	68 cpl
	Elite	12 cpi	96 cpl
	Elite enlarged	6 cpi	48 cpl
	Elite condensed	20 cpi	160 cpl
	Elite condensed-enlarged	10 cpi	80 cpl
	Micron	15 cpi	120 cpl
	Micron enlarged	7.5 cpi	60 cpl
	Proportional spacing	PS	Varies

(cpl: characters per line)

12. Bit image

Vertical	8, 24, 48 dots
Horizontal	60 dpi/120 dpi/180 dpi/240 dpi/360 dpi (dpi: dot per inch)

13. Buffer

	Receive buffer	Download buffer
BJ-10 mode	49 KB (or 9 KB)	0 KB (or 40 KB)
LQ mode	11 KB	39 KB

14. BJ cartridge

Type	BC-02 (ink cartridge type)
Print head	64 nozzles
Ink color	Black
Number of characters that can be printed	About 700,000 (HQ mode)/cartridge
Ink capacity	About 28 grams (0.9 oz)
Cartridge weight	About 58.5 grams (2.0 oz)

15. Ink exhaustion detection/paper width detection None

16. Noise Approx. 45 dB(A) or less.
As per sound pressure level ISO 7779.

17. Environmental conditions

Operating	Temperature: 5 to 35°C (41 to 95°F) Humidity: 10 to 90% RH (no condensation)
Store	Temperature: 0 to 35°C (32 to 95°F) Humidity: 5 to 95% RH (no condensation)

18. Power supply

USA/Canada	120 V ac, 60 Hz Max. 0.5 (A)	Stand by Avr. 5.0 (W/h)
UK/Australia	240 V ac, 50 Hz Max. 0.3 (A)	Stand by Avr. 5.0 (W/h)
Europe	230 V ac, 50 Hz Max. 0.3 (A)	Stand by Avr. 5.0 (W/h)

19. External dimensions 347 mm (13.7") W x 193.5 mm (7.6") D x 173 mm (6.8") H

20. Weight (including BJ cartridge) Approx. 3 kg (6lb 10oz)

4.2 PAPER SPECIFICATIONS

1. Paper size

Letter (8.5" x 11")
Legal (8.5" x 14")
A4 (210mm x 297mm)
Commercial number 10 envelope (4.1" x 9.5")

2. Paper types

Plain paper
Envelopes (Commercial number 10, Mailwell No. 582)
OHP film (3M CG-3480) Manual feed only

3. Paper weight

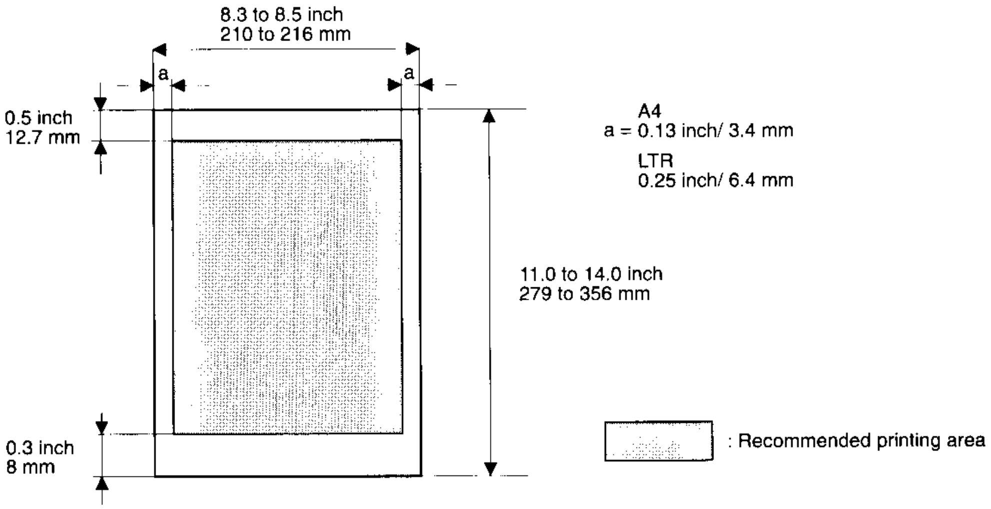
Automatic paper feed	64 to 90 g/m^2 (17 to 24 lb)
Manual paper feed	64 to 105 g/m^2 (17 to 28 lb)

Type	Recommended paper name	Paper size	Paper feed method/feed direction				Remarks
			ASF		Manual feed		
			Vertical	Horizontal	Vertical	Horizontal	
Plain paper	SK	A4	●		●		
	DK	A4	●		●		
	Kangas	A4	●		●		
	Neusidoler	A4	●		●		
	Boise cascade	LTR, LGL	▲		▲		Paper feed ability OK.
	XX4024 (75g/m^2)	LTR, LGL	▲		▲		
	XX4024 (90g/m^2)	LTR, LGL	▲		▲		
	Proper bond	LTR, LGL	▲		▲		
Envelopes	COM#10	240x106 (mm)		▲		▲	
OHP	3M CG-3480	A4, LTR			▲		
Thick Paper	91 to 105g/m^2				▲	▲	

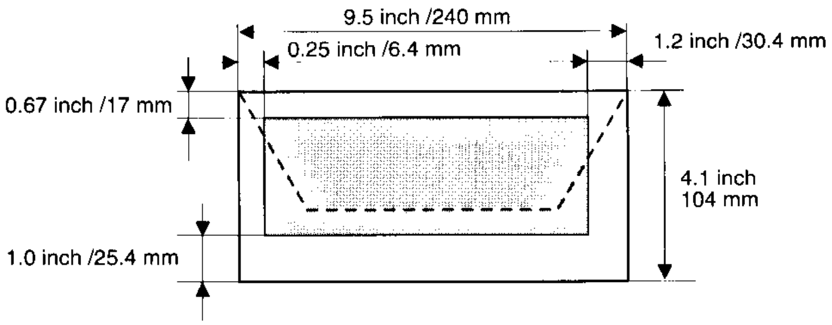
●: Can be used. ▲: Can be used. (Print quality or transportablity may be lower.)

4. Printable range

Plain paper/OHP film


8.3 to 8.5 inch
210 to 216 mm
a
a
0.5 inch
12.7 mm
A4
a = 0.13 inch/ 3.4 mm
LTR
0.25 inch/ 6.4 mm
11.0 to 14.0 inch
279 to 356 mm
0.3 inch
8 mm
: Recommended printing area

Envelopes


9.5 inch /240 mm
0.25 inch /6.4 mm
1.2 inch /30.4 mm
0.67 inch /17 mm
4.1 inch
104 mm
1.0 inch /25.4 mm

4.3 Interface Specification

The parallel interface sends 8 bits (one byte) of data at one time and is transistor-transistor-logic (TTL) compatible. The interface cable must use American Wire Gauge (AWG) No.28 or large wires. The maximum length of the twisted-pair shielded cable is 2.0 m (about 6.5 ft.)

1. Interface type Standard Centronics-type
2. Data transmission 8-bit parallel interface (IBM PC compatible)
3. Signal voltage levels

Low:	0.0 to +0.4 V
High:	+2.4 to +5.0 V

4. Interface cable

Type:	Twisted-pair shielded cable
Material:	AWG28 or larger
Length:	Up to 2.0 m (6.6 feet)

5. Interface connectors

Printer side:	Amphenol 57-40360 (or equivalent)
Cable side:	Amphenol 57-30360 (or equivalent)

6. Pin Assignments

Pin	Signal	Type	Pin	Signal	Type
1	$\overline{\text{STROBE}}$	Input	19	$\overline{\text{STROBE}}$ -RET*1	
2	DATA1	Input	20	DATA1 -RET	
3	DATA2	Input	21	DATA2 -RET	
4	DATA3	Input	22	DATA3 -RET	
5	DATA4	Input	23	DATA4 -RET	
6	DATA5	Input	24	DATA5 -RET	
7	DATA6	Input	25	DATA6 -RET	
8	DATA7	Input	26	DATA7 -RET	
9	DATA8	Input	27	DATA8 -RET	
10	$\overline{\text{ACKNLG}}$	Output	28	$\overline{\text{ACKNLG}}$ -RET	
11	BUSY	Output	29	BUSY -RET	
12	P.E.	Output	30	P.E. -RET	
13	$\overline{\text{SELECT}}$	Output	31	$\overline{\text{INIT}}$	Input
14	AUTO FEED XT		32	ERROR	Output
15	N.C.		33	GND	
16	GND		34	N.C.	
17	GND		35	Vcc (3.3 kΩ pull up)	
18	N.C.		36	SLCT IN	

*1. All -RETs are connected to GND.
*2. N.C. means no connection.
*3. The level is raised to +5.0 V at 5.6 kΩ.
*4. These signals are valid only in LQ printer control mode.

7. Each signal is defined as follows:

$\overline{\text{STROBE}}$

When the printer receives a low $\overline{\text{STROBE}}$ pulse of width greater than 1 second from the computer, it reads the data from the interface and makes the BUSY line high.

DATA

These signals are the 8 bits of parallel data from the computer. A high level indicates a logical 1; a low level, a logical 0. The printer reads the DATA lines when a $\overline{\text{STROBE}}$ pulse is received.

$\overline{\text{ACKNLG}}$

The $\overline{\text{ACKNLG}}$ pulse tells the computer that the data from the previous $\overline{\text{STROBE}}$ pulse has been read. An $\overline{\text{ACKNLG}}$ pulse is also generated when the printer is powered on, or at the completion of printer initialization by an $\overline{\text{INIT}}$ request from the computer.

BUSY

When the printer makes BUSY high, it cannot receive data. The BUSY line goes high in response to a $\overline{\text{STROBE}}$ pulse. This line remains high until the data is read. BUSY is also high in the following cases:

- The receive buffer is full of data.
- The printer receives an $\overline{\text{INIT}}$ signal.
- The *ON LINE* key is pressed to put the printer offline.
- A printer error condition, such as out-of-paper, has occurred.

P.E.

The printer makes P.E (Paper End) high when it determines that it has run out of paper or that a paper jam has occurred. P.E. remains high until the operator loads paper and presses the *ON LINE* key.

SELECT

When the printer is ready, it makes the SELECT line high. The SELECT line goes low in the following cases:

- The *ON LINE* key is pressed to put the printer offline.
- An error condition, such as out-of-paper, has occurred.
- The printer receives the Printer Deselect command. It ignores all incoming data except DC1, which returns the printer to the selected state.

$\overline{\text{AUTO FEED XT}}$

When this signal is low, the printer automatically feeds the paper one line when a carriage return (CR) control code is received. This signal is valid only in LQ printer control mode.

$\overline{\text{INIT}}$

$\overline{\text{INIT}}$ from the system resets the printer to its initial power-on state. The BUSY line goes high, and any received data is printed. When $\overline{\text{INIT}}$ goes low, the printer resets itself to the power-on default state.

$\overline{\text{ERROR}}$

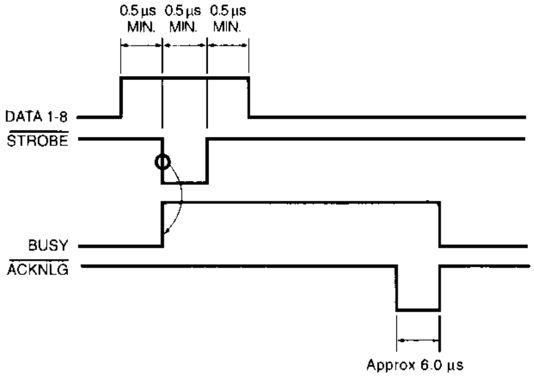
The printer makes the $\overline{\text{ERROR}}$ line low if it detects an error or out-of-paper condition.

SLCT IN

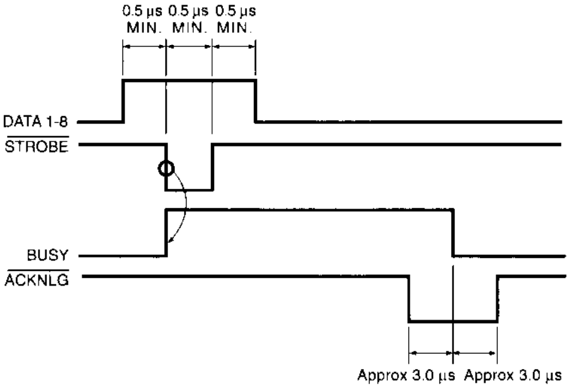
When this signal is high, the DC1 and DC3 control codes are valid; otherwise, they are invalid. This signal is valid only in LQ printer control mode.

8.Timing

BJ-10 mode


0.5µs MIN.
0.5µs MIN.
0.5µs MIN.
DATA 1-8
STROBE
BUSY
ACKNLG
Approx 6.0 µs

LQ mode


0.5 µs MIN.
0.5 µs MIN.
0.5 µs MIN.
DATA 1-8
STROBE
BUSY
ACKNLG
Approx 3.0 µs
Approx 3.0 µs

The parallel interface transfers data in one direction only-from computer to printer. The data path is 8 bits wide. The printer and the computer synchronize data transfer with the STROBE, ACKNLG, and BUSY interface signals. When the computer is ready to send a byte of data to the printer, it puts the byte on the data lines (DATA 1 through DATA 8), then sends a STROBE pulse to the printer. The printer responds with a BUSY signal. After the printer has received the data, it pulses the ACKNLG line to signal to the computer that it has read the byte into its memory. If the printer buffers are not full and the printer can receive more data, the printer negates the BUSY signal.

The timing chart above illustrates activity on the data and handshake lines during the transfer of one byte of data from the computer. DATA 1 through DATA 8 and the STROBE line are driven by the computer; the ACKNLG line is driven by the printer.

4.4 Character Code Tables

4.4.1 BJ-10 mode

USA Code Page 437
Character Set 1

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	NUL 0	16	SP 32	0 48	@ 64	P 80	` 96	p 112	NUL 128	144	á 160	176	└ 192	╨ 208	α 224	≡ 240	0000
1	1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	129	DC1 145	í 161	177	┴ 193	╤ 209	ß 225	± 241	0001
2	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	ó 162	178	┬ 194	╥ 210	Γ 226	≥ 242	0010
3	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243	0011
4	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244	0100
5	5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245	0101
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246	0110
7	BEL 7	23	' 39	7 55	G 71	W 87	g 103	w 119	BEL 135	151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247	0111
8	BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	BS 136	CAN 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248	1000
9	HT 9	25	) 41	9 57	I 73	Y 89	i 105	y 121	HT 137	153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249	1001
A	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250	1010
B	VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	VT 139	ESC 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251	1011
C	FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	| 124	FF 140	FS 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	ⁿ 252	1100
D	CR 13	29	- 45	= 61	M 77	] 93	m 109	} 125	CR 141	157	¡ 173	╜ 189	═ 205	▌ 221	∅ 237	² 253	1101
E	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	SO 142	158	<< 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254	1110
F	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	SI 143	159	>> 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No

USA Code Page 437
Character Set 2

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	NUL 0	16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	176	└ 192	╨ 208	α 224	≡ 240	0000
1	1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	177	┴ 193	╤ 209	ß 225	± 241	0001
2	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	178	┬ 194	╥ 210	Γ 226	≥ 242	0010
3	♥ 3	19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243	0011
4	♦ 4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245	0101
6	♠ 6	22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246	0110
7	BEL 7	23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247	0111
8	BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248	1000
9	HT 9	25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249	1001
A	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250	1010
B	VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251	1011
C	FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	ⁿ 252	1100
D	CR 13	29	- 45	= 61	M 77	] 93	m 109	} 125	ì 141	¥ 157	¡ 173	╜ 189	═ 205	▌ 221	∅ 237	² 253	1101
E	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	Pts 158	<< 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254	1110
F	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	Å 143	ƒ 159	>> 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

USA Code Page 437

All-character Chart

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	Ø 0	► 16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	176	└ 192	╨ 208	α 224	≡ 240	0000
1	☺ 1	◄ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	177	┴ 193	╤ 209	ß 225	± 241	0001
2	● 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242	0010
3	♥ 3	‼ 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	╘ 212	Σ 228	⌠ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246	0110
7	• 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	ⁿ 252	1100
D	♪ 13	↔ 29	- 45	= 61	M 77	] 93	m 109	} 125	ì 141	¥ 157	¡ 173	╜ 189	═ 205	▌ 221	∅ 237	² 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	Pts 158	<< 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Å 143	ƒ 159	>> 175	┐ 191	╧ 207	▀ 223	∩ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Multilingual Code Page 850

Character Set 1

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	NUL 0	16	SP 32	0 48	@ 64	P 80	` 96	p 112	NUL 128	144	á 160	176	└ 192	ð 208	Ó 224	– 240	0000
1	1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	129	DC1 145	í 161	177	┴ 193	Ð 209	ß 225	± 241	0001
2	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	ó 162	░ 178	┬ 194	Ê 210	Ô 226	= 242	0010
3	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243	0011
4	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244	0100
5	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	Ñ 165	Á 181	┼ 197	ı 213	Õ 229	§ 245	0101
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	ª 166	Â 182	ã 198	Í 214	µ 230	÷ 246	0110
7	BEL 7	23	' 39	7 55	G 71	W 87	g 103	w 119	BEL 135	151	º 167	À 183	Ã 199	Î 215	þ 231	¸ 247	0111
8	BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	BS 136	CAN 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248	1000
9	HT 9	25	) 41	9 57	I 73	Y 89	i 105	y 121	HT 137	153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249	1001
A	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250	1010
B	VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	VT 139	ESC 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251	1011
C	FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	| 124	FF 140	156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252	1100
D	CR 13	29	- 45	= 61	M 77	] 93	m 109	} 125	CR 141	157	¡ 173	¢ 189	═ 205	¦ 221	Ý 237	² 253	1101
E	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	SO 142	158	<< 174	¥ 190	╬ 206	Ì 222	– 238	■ 254	1110
F	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	SI 143	159	>> 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Multilingual Code Page 850

Character Set 2

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	NUL 0	16	SP 32	0 48	@ 64	P 80	` 96	p 112	NUL 128	144	á 160	176	└ 192	ð 208	Ó 224	− 240	0000
1	1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	129	DC1 145	í 161	177	┴ 193	Ð 209	ß 225	± 241	0001
2	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	ó 162	▓ 178	┬ 194	Ê 210	Ô 226	= 242	0010
3	3	19	# 35	3 51	C 67	S 83	c 99	s 115	131	147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243	0011
4	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244	0100
5	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	Ñ 165	Á 181	┼ 197	ı 213	Õ 229	§ 245	0101
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	ª 166	Â 182	ã 198	Í 214	µ 230	÷ 246	0110
7	BEL 7	23	' 39	7 55	G 71	W 87	g 103	w 119	BEL 135	151	º 167	À 183	Ã 199	Î 215	þ 231	¸ 247	0111
8	BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	BS 136	CAN 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248	1000
9	HT 9	25	) 41	9 57	I 73	Y 89	i 105	y 121	HT 137	153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249	1001
A	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250	1010
B	VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	VT 139	ESC 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251	1011
C	FF 12	FS 28	, 44	< 60	L 76	\ 92	l 108	| 124	FF 140	156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252	1100
D	CR 13	29	- 45	= 61	M 77	] 93	m 109	} 125	CR 141	157	¡ 173	¢ 189	═ 205	¦ 221	Ý 237	² 253	1101
E	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	SO 142	158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254	1110
F	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	127	SI 143	159	» 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Multilingual Code Page 850

All-character Chart

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	0 0	► 16	32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	176	└ 192	ð 208	Ó 224	− 240	0000
1	☺ 1	◄ 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	177	┴ 193	Ð 209	ß 225	± 241	0001
2	● 2	↕ 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	▓ 178	┬ 194	Ê 210	Ô 226	= 242	0010
3	♥ 3	‼ 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	Ë 211	Ò 227	¾ 243	0011
4	♦ 4	¶ 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	─ 196	È 212	õ 228	¶ 244	0100
5	♣ 5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	Á 181	┼ 197	ı 213	Õ 229	§ 245	0101
6	♠ 6	▬ 22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	Â 182	ã 198	Í 214	µ 230	÷ 246	0110
7	• 7	↨ 23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	À 183	Ã 199	Î 215	þ 231	¸ 247	0111
8	◘ 8	↑ 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	© 184	╚ 200	Ï 216	Þ 232	° 248	1000
9	○ 9	↓ 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	® 169	╣ 185	╔ 201	┘ 217	Ú 233	¨ 249	1001
A	◙ 10	→ 26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Û 234	· 250	1010
B	♂ 11	← 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	ø 155	½ 171	╗ 187	╦ 203	█ 219	Ù 235	¹ 251	1011
C	♀ 12	∟ 28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	ý 236	³ 252	1100
D	♪ 13	↔ 29	- 45	= 61	M 77	] 93	m 109	} 125	ì 141	Ø 157	¡ 173	¢ 189	═ 205	¦ 221	Ý 237	² 253	1101
E	♫ 14	▲ 30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	× 158	« 174	¥ 190	╬ 206	Ì 222	¯ 238	■ 254	1110
F	☼ 15	▼ 31	/ 47	? 63	O 79	_ 95	o 111	⌂ 127	Å 143	ƒ 159	» 175	┐ 191	¤ 207	▀ 223	´ 239	SP 255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No

4.4.2 LQ mode

Epson Italic Character Set

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	NUL 0	16	SP 32	0 48	@ 64	P 80	` 96	p 112	NUL 128	144	SP 160	0 176	@ 192	P 208	` 224	p 240	0000
1	1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	129	DC1 145	! 161	1 177	A 193	Q 209	a 225	q 241	0001
2	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	130	DC2 146	" 162	2 178	B 194	R 210	b 226	r 242	0010
3	3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115	131	DC3 147	# 163	3 179	C 195	S 211	c 227	s 243	0011
4	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	132	DC4 148	$ 164	4 180	D 196	T 212	d 228	t 244	0100
5	5	21	% 37	5 53	E 69	U 85	e 101	u 117	133	149	% 165	5 181	E 197	U 213	e 229	u 245	0101
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118	134	150	& 166	6 182	F 198	V 214	f 230	v 246	0110
7	BEL 7	23	' 39	7 55	G 71	W 87	g 103	w 119	BEL 135	151	' 167	7 183	G 199	W 215	g 231	w 247	0111
8	BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	BS 136	CAN 152	(168	8 184	H 200	X 216	h 232	x 248	1000
9	HT 9	EM 25	) 41	9 57	I 73	Y 89	i 105	y 121	HT 137	EM 153	) 169	9 185	I 201	Y 217	i 233	y 249	1001
A	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	LF 138	154	* 170	: 186	J 202	Z 218	j 234	z 250	1010
B	VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	VT 139	ESC 155	+ 171	; 187	K 203	[219	k 235	{ 251	1011
C	FF 12	28	, 44	< 60	L 76	\ 92	l 108	| 124	FF 140	156	, 172	< 188	L 204	\ 220	l 236	| 252	1100
D	CR 13	29	– 45	= 61	M 77	] 93	m 109	} 125	CR 141	157	– 173	= 189	M 205	] 221	m 237	} 253	1101
E	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	SO 142	158	. 174	> 190	N 206	^ 222	n 238	~ 254	1110
F	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	DEL 127	SI 143	159	/ 175	? 191	O 207	_ 223	o 239	255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

Epson Graphic Character Set

Hex No.	0	1	2	3	4	5	6	7	8	9	A	B	C	D	E	F	
0	NUL 0	16	SP 32	0 48	@ 64	P 80	` 96	p 112	Ç 128	É 144	á 160	░ 176	└ 192	╨ 208	α 224	≡ 240	0000
1	1	DC1 17	! 33	1 49	A 65	Q 81	a 97	q 113	ü 129	æ 145	í 161	▒ 177	┴ 193	╤ 209	ß 225	± 241	0001
2	2	DC2 18	" 34	2 50	B 66	R 82	b 98	r 114	é 130	Æ 146	ó 162	▓ 178	┬ 194	╥ 210	Γ 226	≥ 242	0010
3	3	DC3 19	# 35	3 51	C 67	S 83	c 99	s 115	â 131	ô 147	ú 163	│ 179	├ 195	╙ 211	π 227	≤ 243	0011
4	4	DC4 20	$ 36	4 52	D 68	T 84	d 100	t 116	ä 132	ö 148	ñ 164	┤ 180	196	╘ 212	Σ 228	⌠ 244	0100
5	5	§ 21	% 37	5 53	E 69	U 85	e 101	u 117	à 133	ò 149	Ñ 165	╡ 181	┼ 197	╒ 213	σ 229	⌡ 245	0101
6	6	22	& 38	6 54	F 70	V 86	f 102	v 118	å 134	û 150	ª 166	╢ 182	╞ 198	╓ 214	µ 230	÷ 246	0110
7	BEL 7	23	' 39	7 55	G 71	W 87	g 103	w 119	ç 135	ù 151	º 167	╖ 183	╟ 199	╫ 215	τ 231	≈ 247	0111
8	BS 8	CAN 24	(40	8 56	H 72	X 88	h 104	x 120	ê 136	ÿ 152	¿ 168	╕ 184	╚ 200	╪ 216	Φ 232	° 248	1000
9	HT 9	EM 25	) 41	9 57	I 73	Y 89	i 105	y 121	ë 137	Ö 153	⌐ 169	╣ 185	╔ 201	┘ 217	Θ 233	• 249	1001
A	LF 10	26	* 42	: 58	J 74	Z 90	j 106	z 122	è 138	Ü 154	¬ 170	║ 186	╩ 202	┌ 218	Ω 234	· 250	1010
B	VT 11	ESC 27	+ 43	; 59	K 75	[91	k 107	{ 123	ï 139	¢ 155	½ 171	╗ 187	╦ 203	█ 219	δ 235	√ 251	1011
C	FF 12	28	, 44	< 60	L 76	\ 92	l 108	| 124	î 140	£ 156	¼ 172	╝ 188	╠ 204	▄ 220	∞ 236	ⁿ 252	1100
D	CR 13	29	– 45	= 61	M 77	] 93	m 109	} 125	ì 141	¥ 157	¡ 173	╜ 189	═ 205	▌ 221	Ø 237	² 253	1101
E	SO 14	30	. 46	> 62	N 78	^ 94	n 110	~ 126	Ä 142	Pt 158	<< 174	╛ 190	╬ 206	▐ 222	∈ 238	■ 254	1110
F	SI 15	31	/ 47	? 63	O 79	_ 95	o 111	DEL 127	Å 143	ƒ 159	>> 175	┐ 191	╧ 207	▀ 223	∩ 239	255	1111
	0000	0001	0010	0011	0100	0101	0110	0111	1000	1001	1010	1011	1100	1101	1110	1111	Binary No.

International Character Set

	Country \ Hex	23	24	40	5B	5C	5D	5E	60	7B	7C	7D	7E	A3	A4	C0	DB	DC	DD	DE	E0	FB	FC	FD	FE
	Dec	35	36	64	91	92	93	94	96	123	124	125	126	163	164	192	219	220	221	222	224	251	252	253	254
0	U.S.A	#	$	@	[	\	]	^	`	{	¦	}	~	#	$	@	[	\	]	^	'	{	¦	}	~
1	France	#	$	à	°	ç	§	^	`	é	ù	è	¨	#	$	à	°	ç	§	^	'	é	ù	è	¨
2	Germany	#	$	§	Ä	Ö	Ü	^	`	ä	ö	ü	ß	#	$	§	Ä	Ö	Ü	^	'	ä	ö	ü	ß
3	U.K.	£	$	@	[	\	]	^	`	{	¦	}	~	£	$	@	[	\	]	^	'	{	¦	}	~
4	Denmark I	#	$	@	Æ	Ø	Å	^	`	æ	ø	å	~	#	$	@	Æ	Ø	Å	^	'	æ	ø	å	~
5	Sweden	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü	#	¤	É	Ä	Ö	Å	Ü	é	ä	ö	å	ü
6	Italy	#	$	@	°	\	é	^	ù	à	ò	è	ì	#	$	@	°	\	é	^	ù	à	ò	è	ì
7	Spain I	Pt	$	@	¡	Ñ	¿	^	`	¨	ñ	}	~	Pt	$	@	¡	Ñ	¿	^	'	¨	ñ	}	~
8	Japan	#	$	@	[	¥	]	^	`	{	¦	}	~	#	$	@	[	¥	]	^	'	{	¦	}	~
9	Norway	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü	#	¤	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
10	Denmark II	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü	#	$	É	Æ	Ø	Å	Ü	é	æ	ø	å	ü
11	Spain II	#	$	á	¡	Ñ	¿	é	`	í	ñ	ó	ú	#	$	á	¡	Ñ	¿	é	'	í	ñ	ó	ú
12	Latin America	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú	#	$	á	¡	Ñ	¿	é	ü	í	ñ	ó	ú
13	Korea	#	$	@	[	₩	]	^	`	{	¦	}	~	#	$	@	[	₩	]	^	'	{	¦	}	~
64	Legal	#	$	§	°	'	"	¶	`	©	®	†	™	#	$	§	°	'	"	¶	'	©	®	†	™

1. MAINTENANCE

1.1 Periodically-Replaced Parts

Level	Periodically-replaced parts
User	None
Service engineer	None

1.2 Consumables

Level	Consumables
User	BJ cartridge (BJ-02)
Service engineer	None

1.3 Periodic Maintenance

Level	Periodic maintenance
User	None
Service engineer	None

CAUTION

Use a genuine BJ cartridge in the printer to ensure printing reliability. There are two types of BJ cartridge : BC-01 and BC-02 . To ensure the best of printer performance, be sure to use the BC-02 only. Canon does not guarantee print quality when using the BC-01 with this printer, which might cause low print density and poor print quality.
However,using the BC-01 will not damage the printer or the cartridge.

2. SERVICE TOOLS

2.1 List of Tools

General tools	**Use**
Phillips screwdriver	For removing screws
Flat head screwdriver	For removing plastic parts
Tweezers	For fitting coil springs
Multi meter	For troubleshooting

Special tools	**Use**
Gap gauges (0.5 mm)	For head gap adjustment (Two gauges are necessary.)
BJ Cartridge	BC-02 or BC-01 (Do not use user's BJ cartridge in actual use because the gap gauge may touch the nozzles.)
Grease (FLOIL G311S)	For greasing specified parts.

REF. See the Parts Catalog for the tool numbers of the special tools.

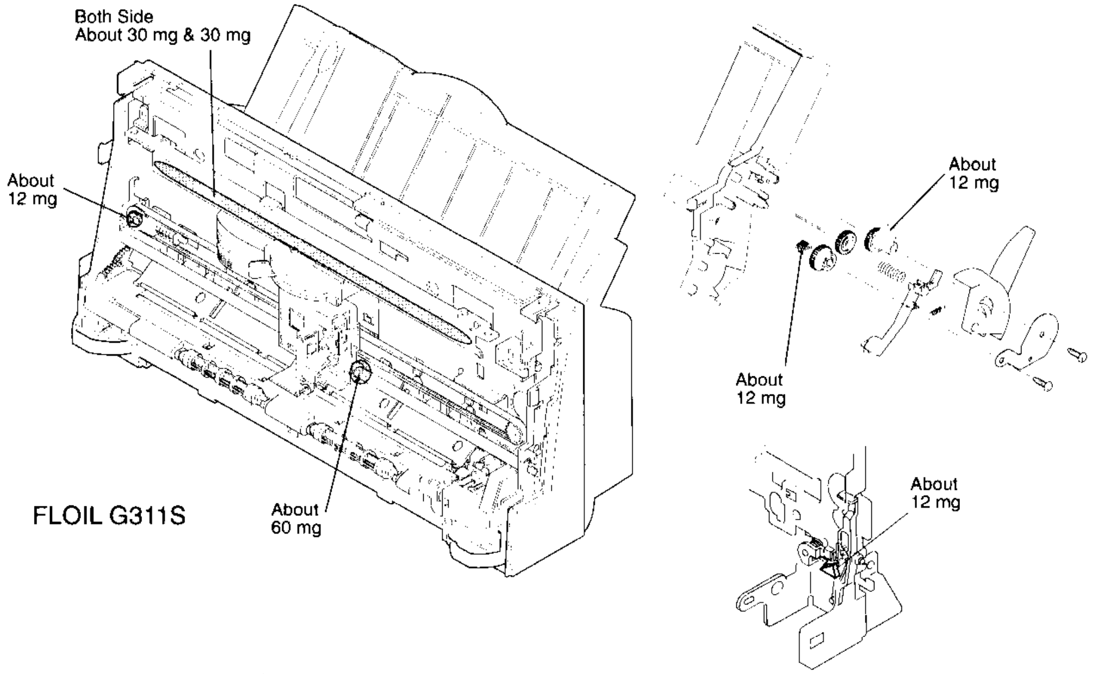

Both Side
About 30 mg & 30 mg
About
12 mg
FLOIL G311S
About
60 mg
About
12 mg
About
12 mg
About
12 mg

Figure 4-1 Points to Grease

3. DISASSEMBLY AND REASSEMBLY

See the Parts Catalog for the disassembly and reassembly procedures. The illustrations in the Parts Catalog are numbered according to the order of disassembly. For parts requiring careful disassembly and reassembly, enlarged views or illustrations are given. Text within illustrations represents key points.

4. ADJUSTMENT

4.1 Adjustment Point

The only printer adjustment to be made is head gap adjustment to keep the distance between the BJ cartridge and platen constant.
By moving the carriage guide frame forward or backward, adjust the head gap so the distance between the BJ cartridge nozzles and the platen is about 1 mm.

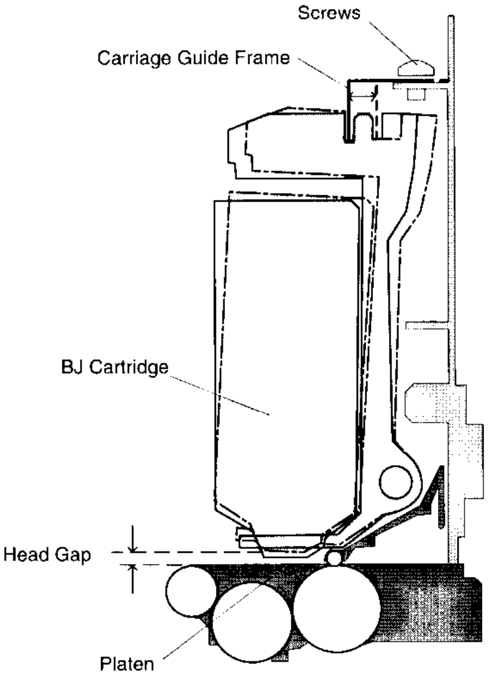


Figure 4-2 Adjustment

4.2 When to Adjust

Adjust the head gap when the position the carriage guide frame is fixed to the printer frame is changed.
The screws holding the carriage guide frame are painted in white to distinguish them from other screws so the frame is not moved by mistake.

4.3 Adjustment Method

4.3.1 Preparation for adjustment

1) Remove the upper case unit. (Or reassemble the printer before installing the rear case.) See the Parts Catalog for the disassembly and reassembly procedures.
2) Mount the service BJ cartridge on the carriage.
3) Push the carriage guide frame in the direction of the arrows and temporarily secure it with the two screws indicated.
4) By moving the carriage belt, move the carriage to position A.

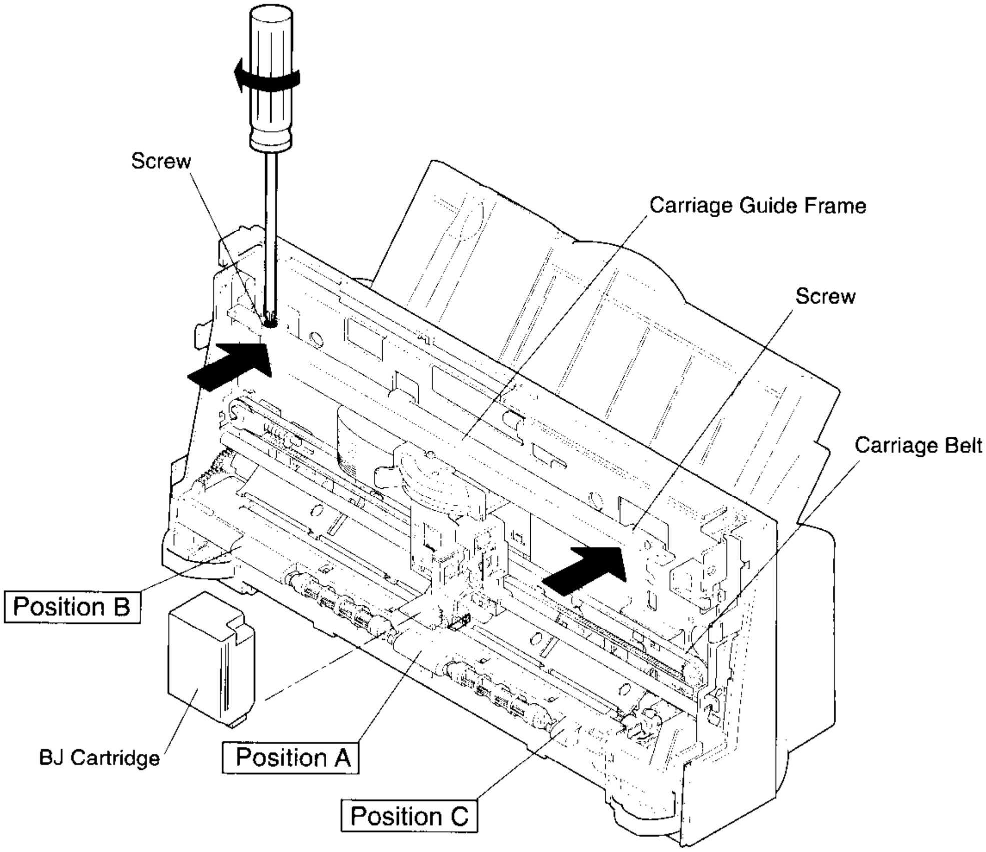

Screw
Carriage Guide Frame
Screw
Carriage Belt
Position B
BJ Cartridge
Position A
Position C

Figure 4-3 Preparation for Adjustment

4.3.2 Adjustment

1) Set the paper thickness adjustment lever to the envelope position.
2) Position the two gap gauges at the left side as shown in Figure 4-4.
3) Move the carriage belt by hand so the BJ cartridge nozzles are at position B over the gap gauge. Do not move the carriage by holding its body; this is inaccurate.
4) Return the paper thickness adjustment lever to the plain paper position.
5) Loosen the two screws indicated by a 1/4 turn.
6) Lightly push the carriage guide frame once or twice as shown in Figure 4-5 to make sure it moves in the direction of the arrows. Then lightly tighten one of the screws. The paper thickness adjustment lever must be at the plain paper position when you do this.
7) Set the paper thickness adjustment lever to the envelope position, and move the carriage to position A.

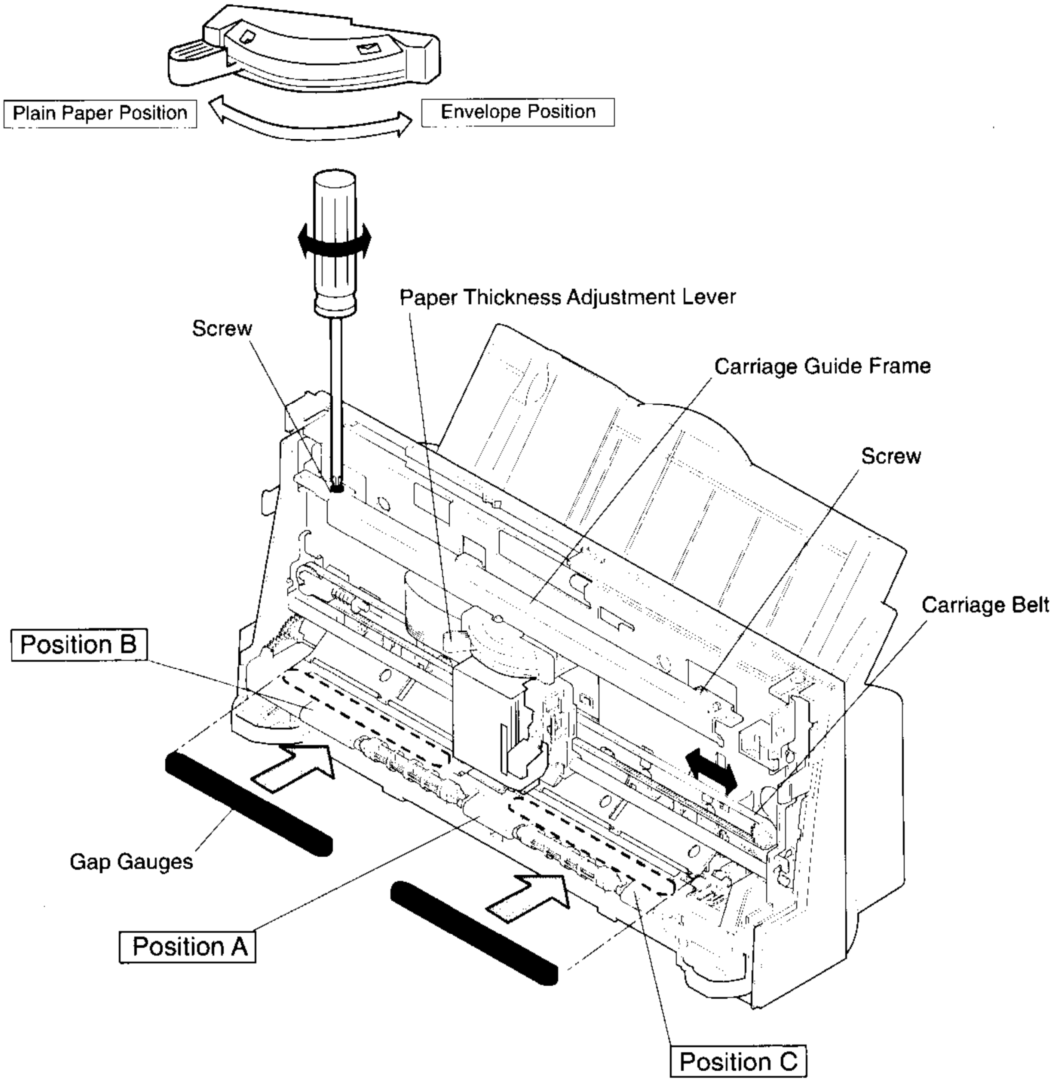

Plain Paper Position
Envelope Position
Screw
Paper Thickness Adjustment Lever
Carriage Guide Frame
Screw
Carriage Belt
Position B
Gap Gauges
Position A
Position C

Figure 4-4 Head Gap Adjustment (1)

8) Position the two gap gauges at the right side as shown in Figure 4-4.
9) Move the carriage belt by hand, so the BJ cartridge nozzles are at position C over the gap gauge. Do not move the carriage by holding its body; this is inaccurate. Return the paper thickness adjustment lever to the plain paper position.
10) Lightly push the carriage guide frame once or twice as shown in Figure 4-5 to make sure it moves in the direction of the arrows. Then lightly tighten the screws that are still loose. (The paper thickness lever must be at the plain paper position when you do this and subsequent tightenings.)
11) Adjust the head gap again at positions B and C.
12) Tighten the two screws securely.

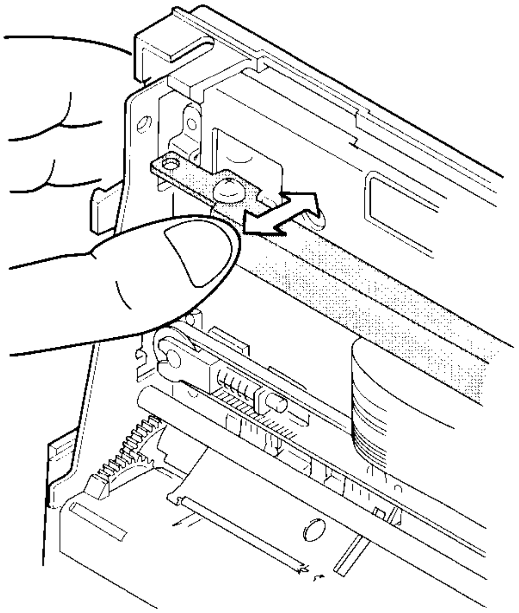


Figure 4-5 Head Gap Adjustment (2)

CAUTION When the carriage is moved, do not hold its body, but move the carriage belt manually to assure accurate adjustment. Secure the screws with the paper thickness change lever at the plain paper position. Do not set the lever to the envelope position.

5. TROUBLESHOOTING

5.1 Troubleshooting Overview

5.1.1 Definition of troubleshooting

Troubleshooting consists of error condition diagnosis, which is required if the cause of an error is unknown, and error recovery, which is performed if the cause of an error is known. If the cause of an error is unknown, perform error condition diagnosis, and if it is known, perform error recovery.

5.1.2 Precautions for troubleshooting

1) Before starting error recovery, make sure all the connectors are plugged in.
2) If the printer is repaired with the power cord connected, be careful you do not get an electric shock from the power supply, and do not short-circuit the PCB.
3) After troubleshooting, make sure that all the connectors have been plugged back in correctly and that all the screws are tight.
4) After troubleshooting, do a print test to make sure the printer works properly.

5.2 Error Condition Diagnosis

If the cause of an error is unknown, perform error condition diagnosis as follows:

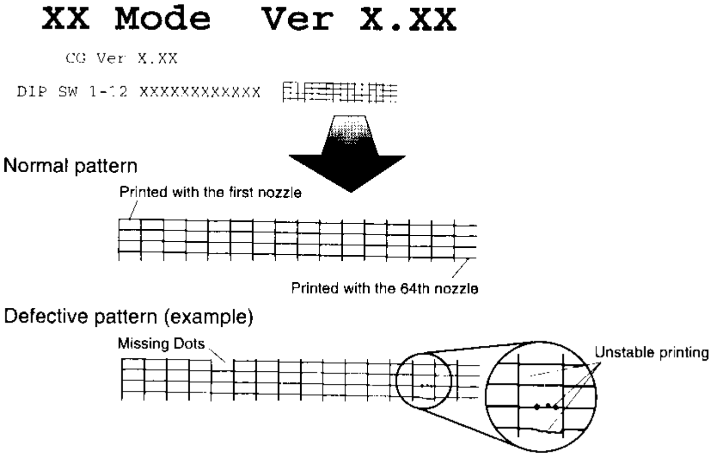
1. 1) Plug one end of the power cord to the printer and the other end into the ac outlet.
   2) Turn on the printer.
   3) All indicators go on and a beep sounds once.
   (The printer does self-diagnostic checks, and initializes each mechanism.)
   4) *POWER*, *ON LINE* and *HQ* (or *HS*) indicators go on.

Correct?

YES **NO**

1) Shown on the error indicator.
   Go to *5.3.2 Error indication.*
2) Not shown on the error indicator.
   Go to *5.3.1 Initialization error.*

2. 1) Turn off the printer.
   2) Set the print paper.
   3) Run the *ANK all-mode print.*
   (Press and hold the *ON LINE* key and switch the power on; release the key when a beep sounds once.)
   4) Print quality check.



XX Mode Ver X.XX

CG Ver X.XX

DIP SW 1-12 XXXXXXXXXXXX

Normal pattern
Printed with the first nozzle
Printed with the 64th nozzle
Defective pattern (example)
Missing Dots
Unstable printing

Correct?

YES **NO**

1) Shown on the error indicator.
   Go to *5.3.2 Error indication.*
2) Not shown on the error indicator.
   2.1) Turn off the printer.
   2.2) Remove and reinstall the BJ cartridge.
   2.3) Run the *ANK all-mode print* again.
   2.4) Print quality check.

Correct?

YES **NO**

Go to *5.3.7 Poor print quality.*

Next page

Before page

3. Turn off the printer, and connect it to the computer.
Turn on the printer.
Send data from the computer to the printer.
Check for Correct characters
Correct spacing
Good quality

Correct?

YES **NO**

Go to *5.3.11 Interface error.*

END

5.3 Error Recovery

5.3.1 Initialization error....4-12
5.3.2 Error indication....4-13
5.3.3 Paper pick-up error....4-14
5.3.4 Paper delivery error....4-15
5.3.5 Carriage control error....4-16
5.3.6 Purge error....4-17
5.3.7 Poor print quality....4-18
5.3.8 Paper feed motor check....4-19
5.3.9 Carriage motor check....4-19
5.3.10 Power not turned on....4-20
5.3.11 Interface error....4-21

5.3.1 Initialization error

1. 1) Plug one end of the power cord to the printer and the other end into the ac outlet.
   2) Turn on the printer.
   3) All indicators go on. (About 0.5 seconds.)
   4) Parallel interface signal - BUSY: High
   5) RAM Check.
   6) Thermistor check
   7) Function selector and control key setting reading
   8) Beep sounds once.

   Correct?

YES **NO**

Go to *5.3.2 Error indication.*

2. Initialize the mechanism.
   (When the mechanism is being initialized, the *POWER* indicator lights, the *ON LINE* indicator flashes, and the ROM is checked.)

   1) Initial movement to move the carriage to its home position

   2) Carriage movement to detect the correction value for the print position (HQ printing value detection)

   3) Initialize the paper feed motor

   4) Maintenance jet

   *5) Rotate the pick-up roller to its initial position (if it is not there already).

   6) Delivery operation

   *7) Auto-cleaning
   (When the power is turned on for the first time after the ac power is supplied or when the BJ cartridge is removed or installed)

   8) Parallel interface signal - Busy: Low

   9) The *ON LINE* indicator lights.

   Correct?

YES **NO**

Go to *5.3.2 Error indicator.*

END

(* This item is not performed if it does not satisfy the condition.)

5.3.2 Error indication

The printer indicators show various printer error states with the beeper.

Error	POWER	ON LINE	HS	HQ	ERROR	Beeper
Paper pick-up error	...	...	...	...	Lit	Three beeps
Paper jam	...	...	...	...	Lit	Four beeps
Carriage control error	...	Flashing	Flashing	Flashing	Lit	Three beeps
Cleaning error	...	Flashing	Flashing	Flashing	Lit	Four beeps
Temperature sensor error	...	Flashing	Flashing	Flashing	Lit	Five beeps
ROM/RAM error	...	Flashing	Flashing	Flashing	Lit	Six beeps

Error recovery method

Paper pick-up error	Go to *5.4.3Paper pick-up error.*
Paper jam	Go to *5.3.4 Paper delivery error.*
Carriage control error	Go to *5.3.5 Carriage control error.*
Cleaning error	Go to *5.3.6 Purge error.*
Temperature sensor error	Replace logic card. (Temperature sensor defective)
ROM/RAM error	Replace logic card. (DRAM or ROM defective)

5.3.3 Paper pick-up error

1. **Is the printer installed in a place that meets the specifications?**
(See page 3-27.)

YES **NO**

Install the printer where the specifications are met.

2. **Is printing paper that meets the specifications being used?**
(See page 3-27.)

YES **NO**

Use printing paper that meets the specifications.

3. Paper selection lever position check. (See page 2-4.)
Is the lever set to the correct position for the print paper being used?

YES **NO**

Set the lever to the correct position for the print paper being used.

4. Paper path check.
Is there any foreign object in the printing paper path?

NO **YES**

Remove the foreign object.

5. Roller rotation check
Does the paper feed motor run and do the paper feed roller and eject roller rotate?

YES **NO**

Go to *5.3.8 Paper feed motor check.*

Replace the logic card.
(Pick-up roller sensor defective.)
(MPU defective.)

5.3.4 Paper delivery error

1. **Is the printer installed in a place that meets the specifications?**
(See page 3-27.)

YES **NO**

Install the printer where the specifications are met.

2. **Is printing paper that meets the specifications being used?**
(See page 3-27.)

YES **NO**

Use printing paper that meets the specifications.

3. Printing paper path visual check. (See page 2-4.)
Is there any foreign object in the printing paper path?

NO **YES**

Remove the foreign object.

4. Roller rotation visual check
Does the paper feed motor run and do the paper feed roller and eject roller rotate?

YES **NO**

Go to *5.3.8 Paper feed motor check.*

Replace the logic card.
(Paper sensor defective.)
(MPU defective.)

5.3.5 Carriage control error

1. Printing paper path visual check.
   Is there any foreign object in the printing paper path?

NO **YES**

Remove the foreign object.

2. Carriage drive part visual check.
   (Disengagement of the carriage belt, deformation of the carriage or carriage guide frame, etc.)
   Correct?

YES **NO**

Repair or replace any defective part.

3. **Does the carriage section move during initial operation?**

YES **NO**

Go to *5.3.9 Carriage motor check.*

4. Home position sensor check.

MPU	Sensor condition	Signal level
Pin 70	Open	Low
	Closed	High

Correct?

YES **NO**

Replace the carriage ribbon cable assembly.

5. Carriage ribbon cable check.
   Correct?

YES **NO**

Replace the carriage ribbon cable assembly.

Replace the logic card.

5.3.6 Purge error

1. Printing paper path visual check.
   Is there any foreign object in the printing paper path?

NO **YES**

Remove the foreign object.

2. Carriage drive part visual check.
   (Disengagement of the carriage belt, deformation of the carriage or carriage guide frame, etc.)
   Correct?

YES **NO**

Repair or replace any defective part.

3. **Does the paper feed section move during initial operation?**

YES **NO**

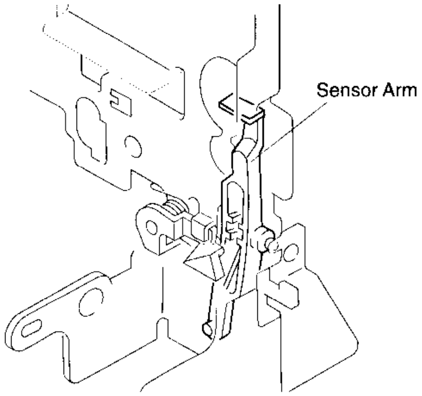
Go to *5.3.8 Paper feed motor check.*

4. 1) Turn off the printer.
   2) Remove and reinstall the BJ cartridge.
   3) Turn on the printer.
   4) The sensor arm moves during initial operation.
   Correct?

NO **YES**

Replace the logic card.

5. Sensor arm visual check.



Correct?

YES **NO**

Repair or replace any defective part.

Replace the purge unit.

5.3.7 Poor print quality

1. **Is the printer installed in a place that the specifications?**
(See page 3-27.)
YES **NO**
Install the printer where the specifications are met.

2. **Is printing paper that meets the specifications being used?**
(See page 3-27.)
YES **NO**
Use printing paper that meets the specifications.

3. **Is the forms thickness lever set to the correct position for the print paper being used?**
YES **NO**
Set the lever to the correct position for the print paper being used.

4. Check whether the paper path is stained with paper dust or ink.
Is it dirty?
NO **YES**
Clean the paper path.

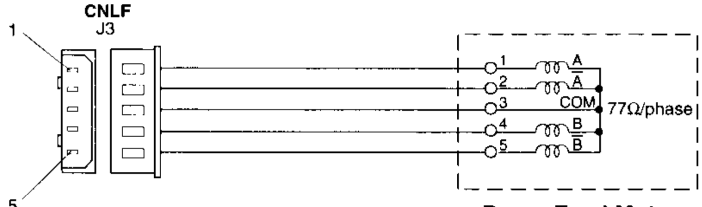
5. 1) Clean the BJ cartridge at least five times.
2) Run the *ANK all-mode print.*
3) Print quality check. (see page 4-9)
Correct?
NO **YES**
END

6. **Are eight consecutive dots or any specific dots missing?**
YES **NO**
7. 1) Replace the BJ cartridge.
2) Clean the BJ cartridge five times or more.
3) Run the *ANK all-mode print.* (See page 4-9.)
4) Print quality check. (see page 4-9)
Correct?
YES **NO**
Replace the purge unit.
END

7. 1) Replace the BJ cartridge.
2) Clean the BJ cartridge five times or more.
3) Run the *ANK all-mode print.* (See page 4-9.)
Correct?
YES **NO**
Replace the logic card.
END

5.3.8 Paper feed motor check

1. Check the paper feed motor coil. : about 77Ω per phase


CNLF
J3
1
5
1
2
3
4
5
A
Ā
COM
B
B̄
77Ω/phase

Paper Feed Motor

Correct?

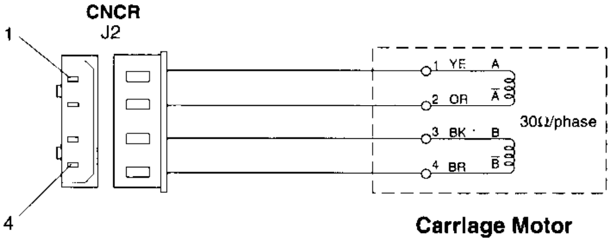
YES **NO**

Replace the paper feed motor.

2. Replace the logic card.
   (Paper feed motor driver defective.)
   (MPU defective.)

5.3.9 Carriage motor check

1. Check the carriage motor coil. : about 30Ω per phase


CNCR
J2
1
4
1 YE A
2 OR Ā
3 BK B
4 BR B̄
30Ω/phase

Carriage Motor

Correct?

YES **NO**

Replace the carriage motor.

2. Replace the logic card.
   (Carriage motor driver defective.)
   (MPU defective.)

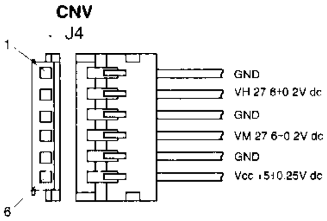
5.3.10 Power not turned on

1. **Is there a voltage present at the ac inlet?**

YES **NO**

Check the ac inlet.

2. Check the power supply output. (CN 3)


CNV
J4
1
6
GND
VH 27 6+0 2V dc
GND
VM 27 6-0 2V dc
GND
Vcc +5±0.25V dc

Power supply unit	Meter connection	Reading
CN3	CN3 pins 1 and 2	27.6 ± 0.2 V dc (VH)
	CN3 pins 3 and 4	27.6 ± 0.2 V dc (VM)
	CN3 pins 5 and 6	5 ± 0.25 V dc (Vcc)

Are the following voltages output?

NO **YES**

Replace the logic card.

3. Remove the power cord.
Remove the fuse.
Check the fuse.
Is the fuse correct?

YES **NO**

Replace the fuse.

Replace the power supply unit.

5.3.11 Interface error

1. **Does the printer print?**

YES **NO**

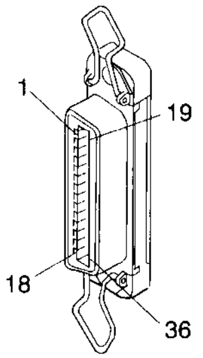
1) Check the interface signals. (on line)

Pin	Signal	Signal level	Pin	Signal	Signal level
1	$\overline{\text{STROBE}}$	High	19	$\overline{\text{STROBE}}$ -RET	Low
2	DATA1	High	20	DATA1 -RET	Low
3	DATA2	High	21	DATA2 -RET	Low
4	DATA3	High	22	DATA3 -RET	Low
5	DATA4	High	23	DATA4 -RET	Low
6	DATA5	High	24	DATA5 -RET	Low
7	DATA6	High	25	DATA6 -RET	Low
8	DATA7	High	26	DATA7 -RET	Low
9	DATA8	High	27	DATA8 -RET	Low
10	$\overline{\text{ACKNLG}}$	High	28	$\overline{\text{ACKNLG}}$ -RET	Low
11	BUSY	Low	29	BUSY -RET	Low
12	P.E.	Low	30	P.E. -RET	Low
13	SELECT	High	31	$\overline{\text{INIT}}$	High
14	$\overline{\text{AUTO FEED XT}}$	High	32	$\overline{\text{ERROR}}$	High
15	(N.C.)	Low	33	GND	Low
16	GND	Low	34	(N.C.)	Low
17	GND	Low	35	VCC	High
18	(N.C.)	Low	36	$\overline{\text{SLCT IN}}$	High

Correct?

YES **NO**

Replace the logic card.



1) The interface cable is defective.
2) Replace the logic card.
   (Printer controller defective.)

2. Turn off the printer.
   Select hexadecimal. dump test mode.
   (Press and hold the *PRINT MODE* key and switch the power on; release the key when a beep sounds once.)
   Print and compare the data sent with the output.
   Correct?

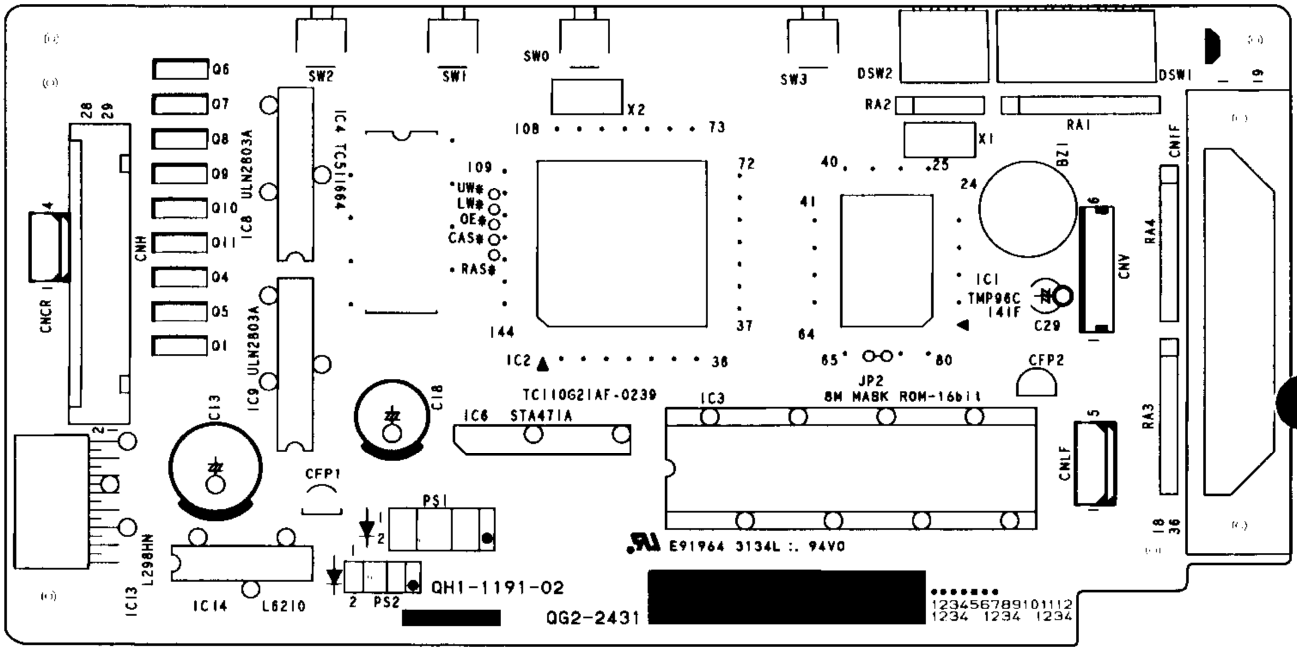
YES **NO**

1) The interface cable is defective.
2) Replace the logic card. (Printer controller defective.)

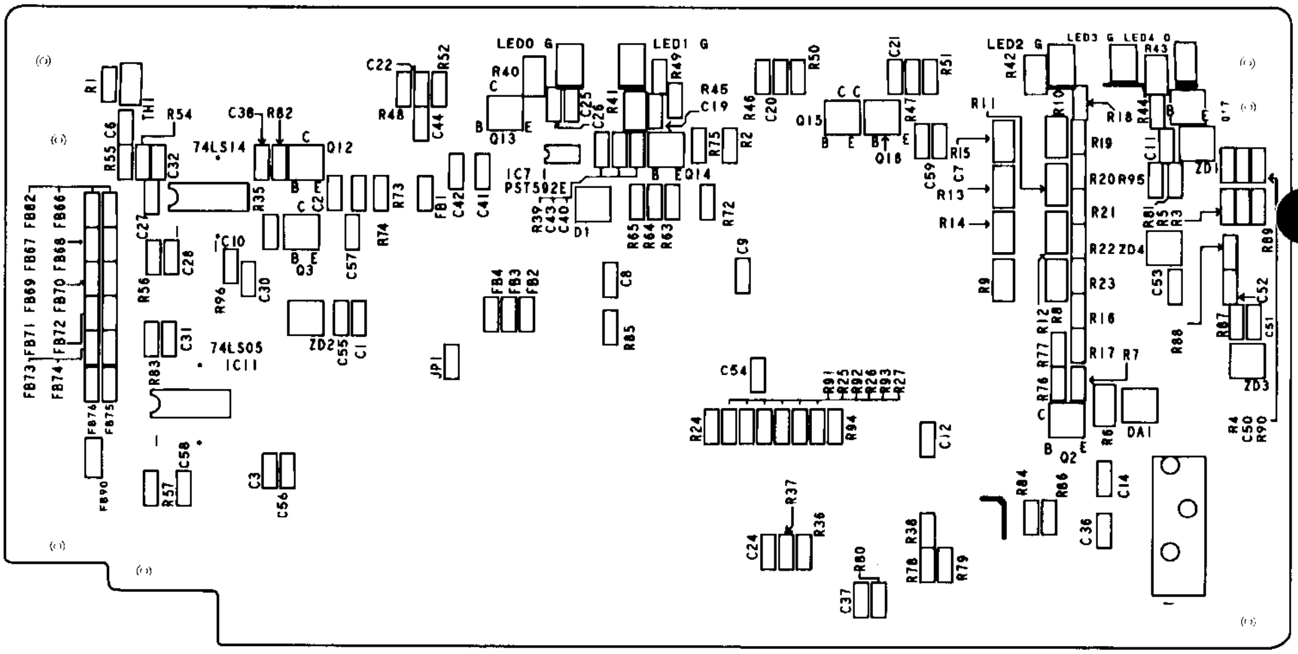
END

6. CIRCUIT DIAGRAMS

6.1 Component Drawings


SW2
SW1
SW0
SW3
DSW2
DSW1
X2
X1
RA2
RA1
BZ1
CNIF
RA4
CNV
RA3
CNLF
Q6
Q7
Q8
Q9
Q10
Q11
Q4
Q5
Q1
CNH
CNCR1
IC8 ULN2803A
IC9 ULN2803A
IC4 TC511664
IC2
TC110G21AF-0239
IC1 TMP96C141F
C29
CFP2
JP2
IC3
8M MASK ROM-16bit
IC6 STA471A
C13
C18
CFP1
PS1
PS2
QH1-1191-02
QG2-2431
IC13 L298HN
IC14
L6210
E91964 3134L 94V0
UW#
LW#
OE#
CAS#
RAS#

Top

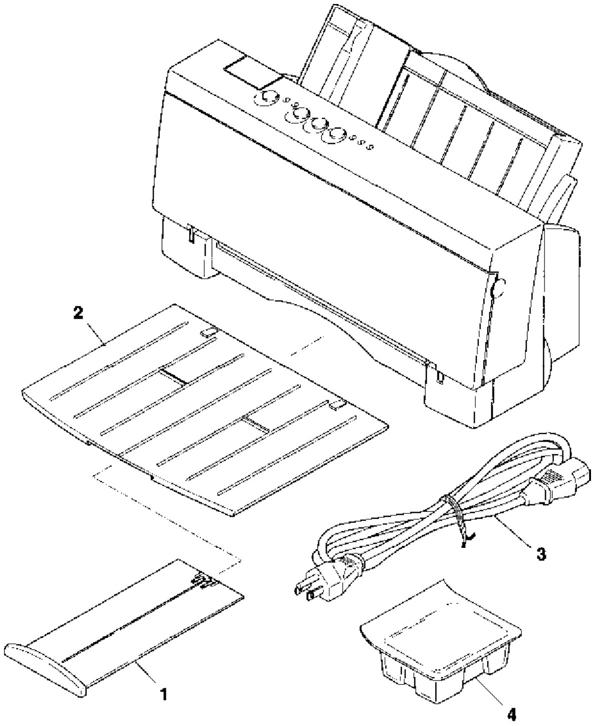

LED0
LED1
LED2
LED3
LED4
R1
TH1
R54
C38
R82
74LS14
Q12
R55
C6
C32
C27
R35
C2
R73
FB1
C42
C41
IC7
PST592E
Q13
C44
R48
C22
R52
R40
C25
C26
R41
R49
R45
C19
R46
C20
R50
Q15
Q16
C21
R47
R51
R11
R15
C7
C59
R13
R14
R9
R10
R42
R43
R44
R18
R19
R20
R95
R21
R22
ZD4
R23
R16
R17
R7
R12
R8
R77
R76
Q2
R6
DA1
C11
ZD1
R81
R5
R3
R89
C53
C52
R87
C51
R88
ZD3
R4
C50
R90
FB73
FB71
FB69
FB67
FB82
FB66
FB68
FB70
FB72
FB74
FB76
FB75
FB90
R56
C28
IC10
R96
C30
Q3
C57
R74
ZD2
C55
C1
C31
R83
74LS05
IC11
C58
R57
C3
C56
FB4
FB3
FB2
JP1
C8
R85
R39
C43
C40
D1
R65
R64
R63
Q14
R75
R2
R72
C9
C54
R91
R25
R92
R26
R93
R27
R24
R94
C12
R37
R36
C24
R80
C37
R38
R78
R79
R84
R86
C14
C36

Bottom

BJ-200

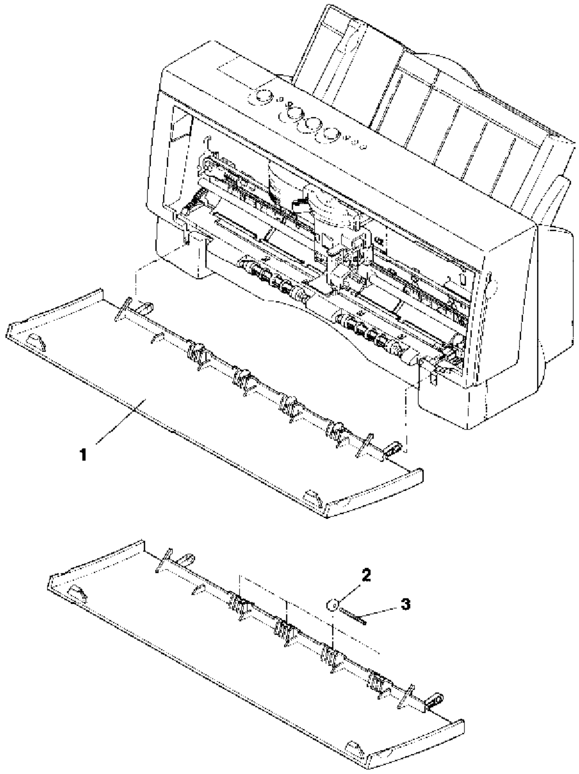
PARTS CATALOG

FIGURE 1 TRAY



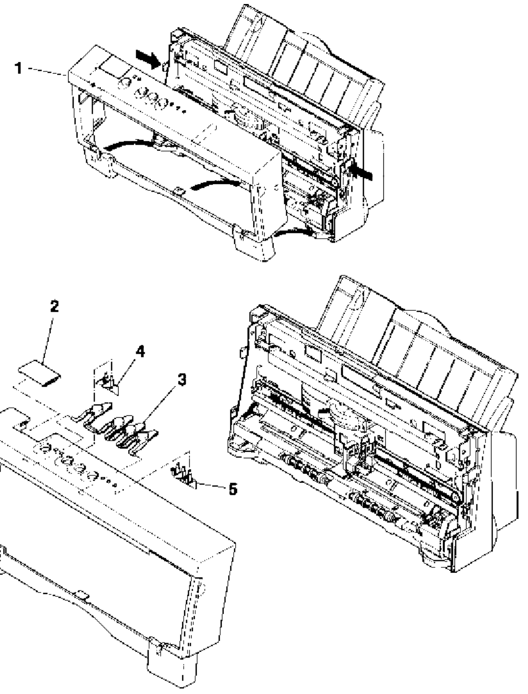
NUM.	PART #	DESCRIPTION
1 - 1		NOT AVAILABLE
2		NOT AVAILABLE
3		NOT AVAILABLE
3		NOT AVAILABLE
3		NOT AVAILABLE
4		NOT AVAILABLE

FIGURE 2 FRONT COVER



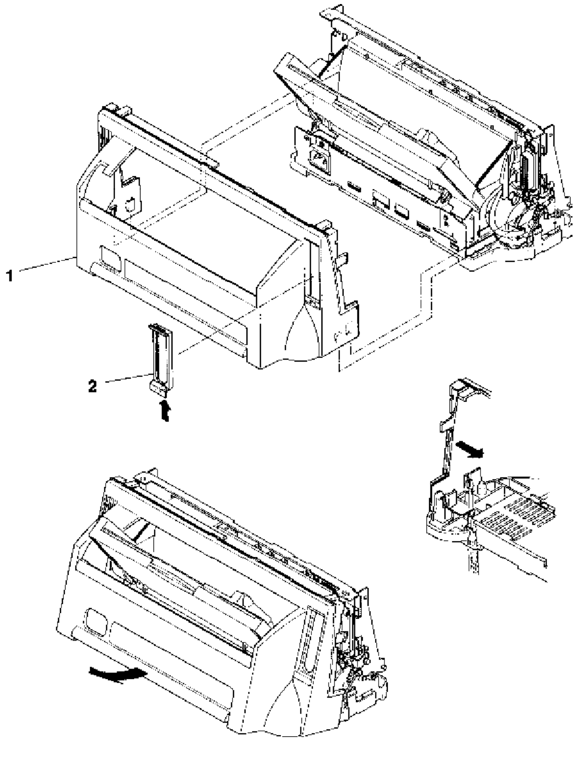
NUM.	PART #	DESCRIPTION
2 - 1	QG5-0122-000	FRONT COVER UNIT
2	QB1-0517-000	SPUR
3	QB1-0518-000	SPUR SHAFT

FIGURE 3 UPPER COVER



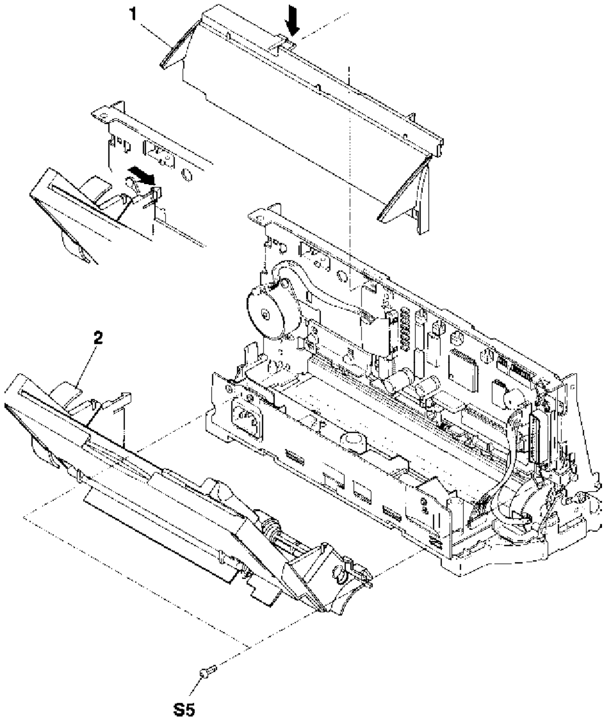
NUM.	PART #	DESCRIPTION
3 - 1	QG5-0121-000	UPPER CASE UNIT
2	QB1-0514-000	COVER TOP ACCESS
3	QB1-0512-040	BUTTON PUSH
4	QB1-0513-000	GUIDE INDICATOR
5	QB1-0515-000	GUIDE INDICATOR

FIGURE 4 REAR COVER



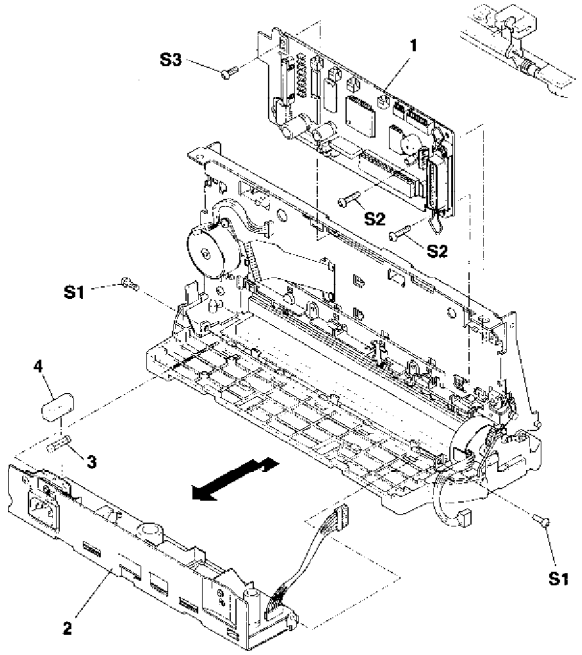
NUM.	PART #	DESCRIPTION
4 - 1	QB1-0519-000	COVER REAR
2	QB1-0416-000	COVER 1/F

FIGURE 5 CUT SHEET FEEDER UNIT



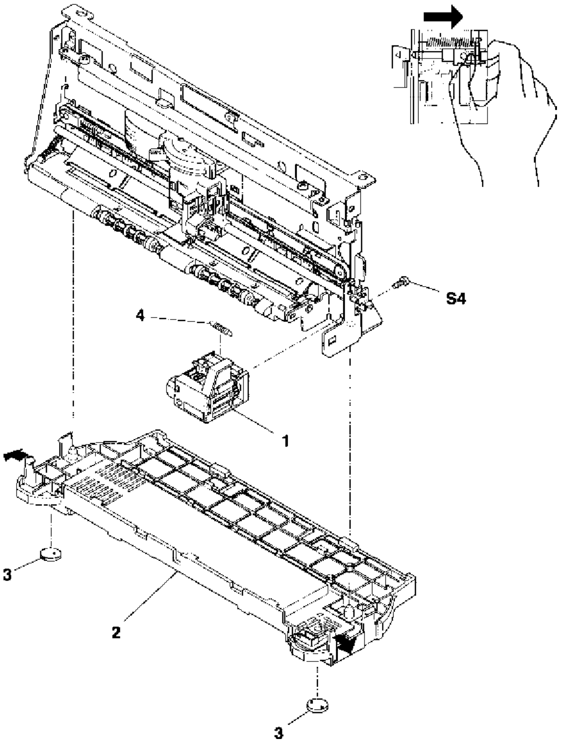
NUM.	PART #	DESCRIPTION
5 - 1	QB1-0520-000	COVER LOGIC CARD
2	QG5-0127-090	CUT SHEET FEEDER UNIT

FIGURE 6 ELECTRICAL PARTS



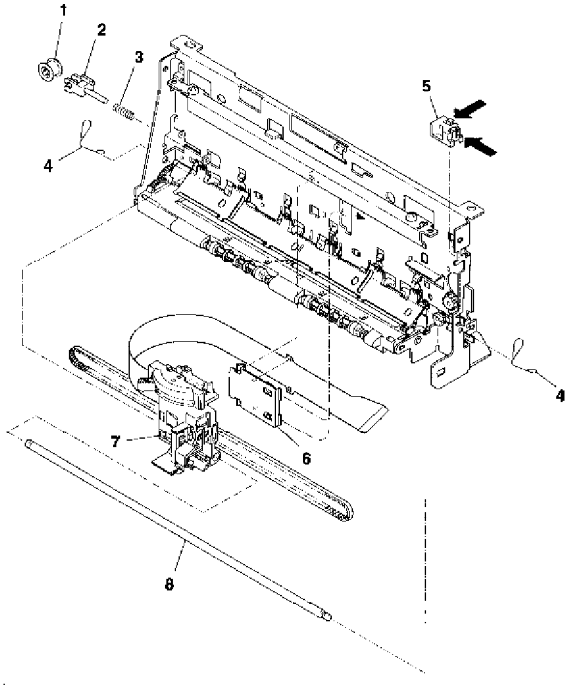
NUM.	PART #	DESCRIPTION
6 - 1	QG2-2431-040	LOGIC BOARD ASS'Y
2	QH3-3121-000	POWER SUPPLY UNIT(115V)
2	QH3-3122-000	POWER SUPPLY UNIT
3		NOT AVAILABLE
4		NOT AVAILABLE

FIGURE 7 BOTTOM CASE & PURGE UNIT



NUM.	PART #	DESCRIPTION
7 - 1	QG5-0126-000	PURGE UNIT
2	QG5-0323-000	BOTTOM COVER UNIT (WITH FOOT)
3	QB1-0507-000	FOOT PRINTER
4	QB1-0467-000	SPRING HOOK END COIL

FIGURE 8 CARRIAGE PART (1)



NUM.	PART #	DESCRIPTION
8 - 1	QB1-0501-020	ROLLER IDLER
2	QB1-0502-000	BRACKET IDLER
3	QB1-0503-000	SPRING COIL
4	QB1-0499-000	CLIP SHAFT
5	QB1-0406-000	GUIDE CORNER
6	QB1-0497-000	HOLDER CARRIAGE RIBBON CABLE
7	QG5-0125-080	CARRIAGE UNIT
8	QB1-0498-000	SHAFT CARRIAGE

FIGURE 9 CARRIAGE PART (2)

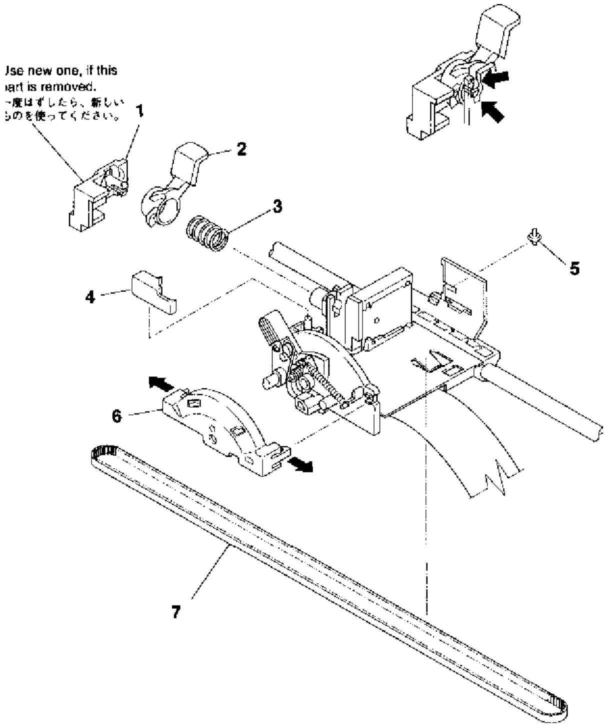
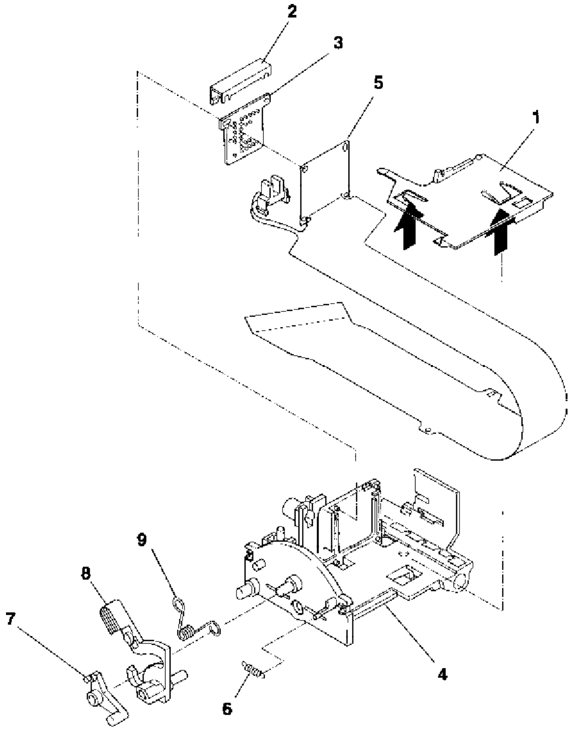

Jse new one, if this
art is removed.
一度はずしたら、新しい
のを使ってください。
1
2
3
4
5
6
7

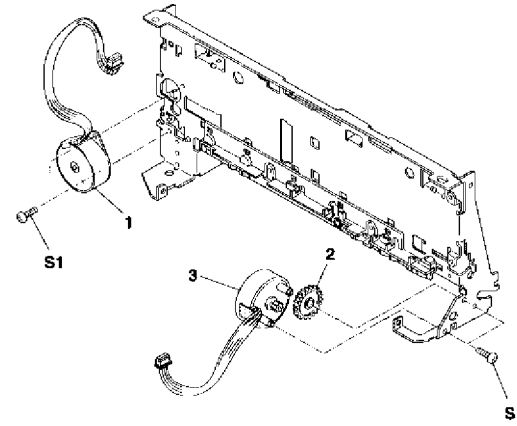
FIGURE 10 CARRIAGE PART (3)



NUM.	PART #	DESCRIPTION
9 - 1	QB1-0440-020	COVER HOOK
2	QB1-0437-000	LEVER HOOKING
3	QB1-0439-000	SPRING COIL
4	QB1-0438-000	HOOK CARRIAGE
5	QB1-0443-000	WHEEL CARRIAGE
6	QB1-0444-000	COVER CARRIAGE TOP
7	QB1-0434-000	BELT CARRIAGE

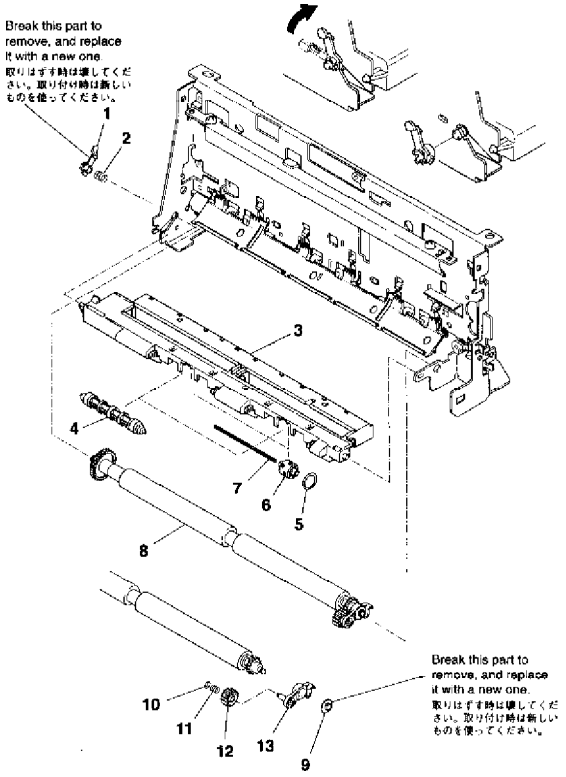
NUM.	PART #	DESCRIPTION
10 - 1	QB1-0435-000	GUIDE RIBBON CABLE
2	QB1-0441-000	HOLDER RIBBON CABLE(UPPER)
3	QB1-0436-000	PAD CONTACT
4	QB1-0432-000	BASE CARRIAGE
5	QG2-2444-000	CARRIAGE RIBBON CABLE ASS'Y
6	QB1-0449-000	SPRING HOOK END COIL
7	QB1-0447-000	CAM TENSION
8	QB1-0445-000	LEVER FORMS THICKNESS
9	QB1-0446-000	SPRING TORSION

FIGURE 11 MOTORS



NUM.	PART #	DESCRIPTION
11 - 1	QH4-4038-000	MOTOR CARRIAGE
2	QB1-0500-000	GEAR SLOW DOWN
3	QH4-4035-000	MOTOR PAPER FEED

FIGURE 12 PAPER FEED PART (1)

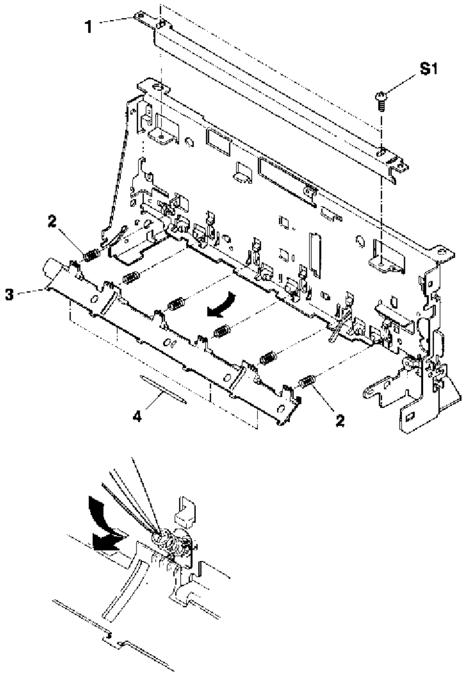


Break this part to remove, and replace it with a new one.
取りはずす時は壊してください。取り付け時は新しいものを使ってください。

Break this part to remove, and replace it with a new one.
取りはずす時は壊してください。取り付け時は新しいものを使ってください。

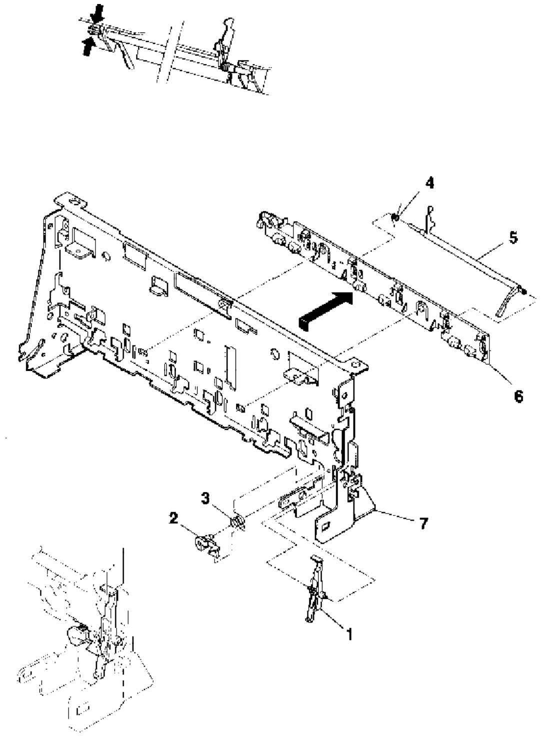
NUM.	PART #	DESCRIPTION
12 - 1	QB1-0417-000	BUSHING
2	QB1-0423-000	SPRING COIL
3	QB1-0418-020	PLATEN
4	QG5-0130-020	EJECT ROLLER ASS'Y
5	QB1-0429-030	RING RUBBER
6	QB1-0428-000	ROLLER TRANSMISSION
7	QB1-0419-000	SHAFT ROLLER
8	QF5-0057-000	FEED ROLLER ASS'Y
9	QB1-0422-000	BUSHING
10		NOT AVAILABLE
11	QB1-0421-000	SPRING COIL
12	QB1-0425-000	GEAR TRANSMISSION
13	QB1-0420-000	ARM TRANSMISSION

FIGURE 13 PAPER FEED PART (2)



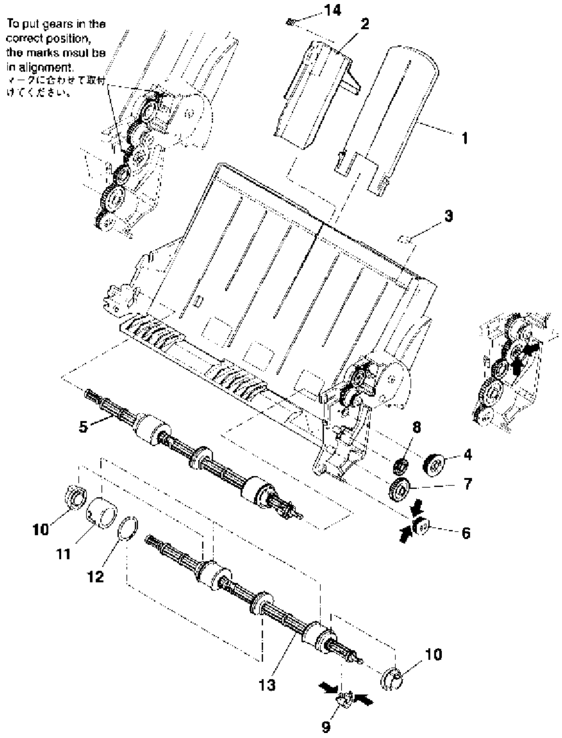
NUM.	PART #	DESCRIPTION
13 - 1	QB1-0404-000	FRAME CARRIAGE GUIDE
2	QB1-0410-000	SPRING COIL
3	QB1-0409-000	PLATE PRESSURE
4		NOT AVAILABLE

FIGURE 14 PRINTER FRAME



NUM.	PART #	DESCRIPTION
14 - 1	QB1-0413-000	ARM SENSOR
2	QB1-0414-000	HOOK CARRIAGE
3	QB1-0415-000	SPRING TORSION
4	QB1-0412-000	SPRING TORSION
5	QB1-0411-000	ARM PAPER SENSOR
6		NOT AVAILABLE
7	QB1-0403-000	FRAME PRINTER

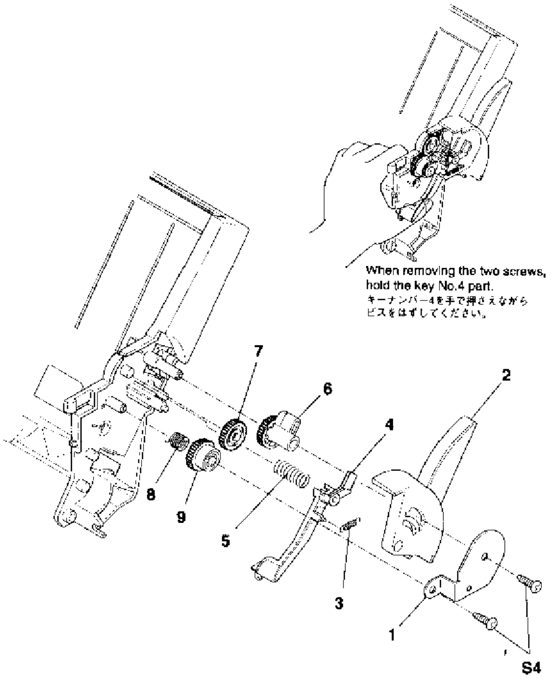
FIGURE 15 CUT SHEET FEEDER PART (1)



To put gears in the correct position, the marks msul be in alignment.
マークに合わせて取付けてください。

NUM.	PART #	DESCRIPTION
15 - 1	QB1-0486-000	SUPPORT PAPER
2	QB1-0481-000	GUIDE PAPER
3		NOT AVAILABLE
4	QB1-0478-000	GEAR PICK-UP ROLLER
5	QG5-0128-030	PICK-UP ROLLER UNIT
6	QB1-0485-000	GEAR TRANSMISSION
7	QB1-0480-000	GEAR TRANSMISSION
8	QB1-0479-000	GEAR TRANSMISSION
9	QB1-0433-000	PAPER GUIDE
10	QB1-0495-000	ROLLER SLIP
11	QB1-0496-000	RING RUBBER PICK-UP (EPDM)
12	QB1-0522-020	RING RUBBER
13	QB1-0494-000	SHAFT PICK-UP ROLLER
14	QB1-0620-000	FILM GUIDE

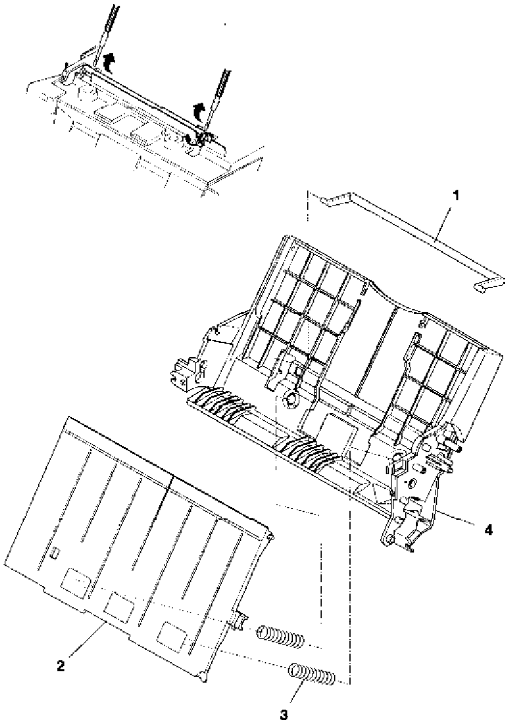
FIGURE 16 CUT SHEET FEEDER PART (2)



When removing the two screws, hold the key No.4 part.
キーナンバー4を手で押さえながらビスをはずしてください。

NUM.	PART #	DESCRIPTION
16 - 1	QB1-0488-000	PLATE LEVER GUIDE
2	QB1-0476-000	LEVER PAPER SELECTION
3	QB1-0490-000	COIL SPRING HOOK END
4	QB1-0475-000	ARM CONNER
5	QB1-0489-000	SPRING COIL
6	QB1-0477-000	GEAR CAM
7	QB1-0484-000	GEAR TRANSMISSION
8	QB1-0482-000	SPRING ONE WAY CLUTCH
9	QB1-0483-000	GEAR ONE WAY CLUTCH

FIGURE 17 CUT SHEET FEEDER PART (3)



NUM.	PART #	DESCRIPTION
17 - 1	QB1-0487-000	CAM ROD PAPER
2	QF5-0059-000	PAPER LIFTING PLATE ASS'Y
3	QB1-0491-000	SPRING COIL
4	QB1-0474-030	FRAME ASF